January 1956

Western Industry

1956 Cost Reduction IDEA-BOOK

60 selected case histories that show how to save money, speed production, or both, under Western plant operating conditions. In 4 sections . . .

Production equipment . . . p. 36

Power transmission . . . p. 56

Pneumatics, hydraulics . . . p. 68

Electrical power . . . p. 80

60 FASTENER MANUALS — best available booklets, yours for the asking . . . p. 84

WESTERN OUTLOOK — special report on industrial progress, prospects . . . p. 19

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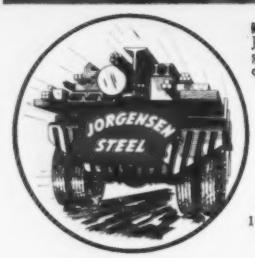

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BEFORE . . . Monarch Mono-Cushion and two competitive tires looked alike.

AFTER . . . there was no doubt! Only the Mono-Cushion still was usable.

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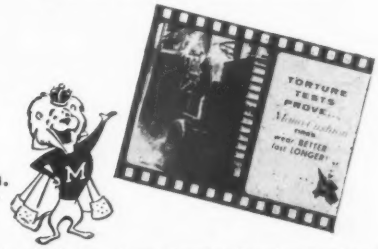
Write for BULLETIN TD-200 for the complete story . . . or refer to Yellow Pages for name of nearest dealer.



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January 1956

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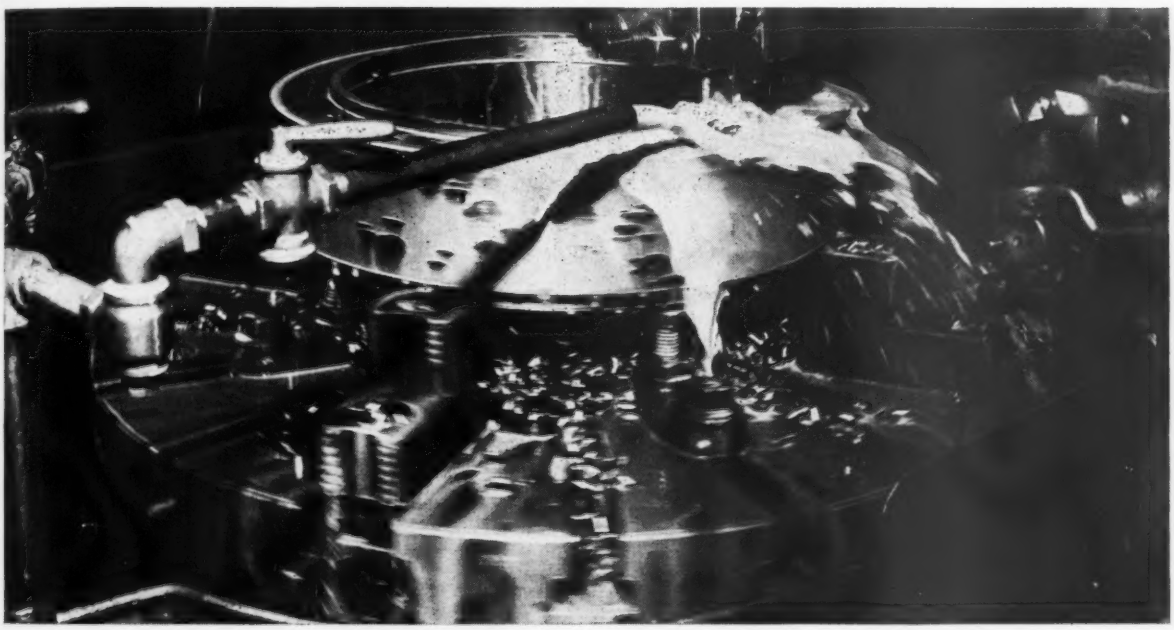
Standard Engineer's Field Report

CASE HISTORY
LUBRICANT Calol Cutting Fluids
FIRM California Press Mfg. Co., San Francisco, Calif.

Low-cost cutting fluid solution stops rust, rancidity for pellet-machine manufacturer!

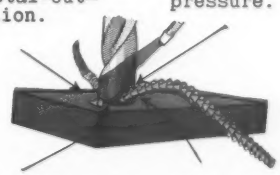


IN MACHINING HEAVY FORGINGS, like this, California Press Manufacturing Co., San Francisco, uses a one to 20 solution of Calol Soluble Oil and water. This light solution efficiently lubricates and cools carbide-tipped tools and work on this 36" vertical turret lathe as well as other machines in the plant. Over a ten-year period, this firm tried numerous competitive products, some costing three times as much, but Calol Soluble Oil is the only one they found which does not turn rancid, separate in storage or let work rust. They use Calol Cutting Fluids in all of their 46 different machine tools.

Why Calol Cutting Fluids solve metal-cutting problems

Specialized products for every metal-cutting operation.

Additives resist rusting, corrosion, pressure.



Flush away cuttings readily.

High cooling and lubricating qualities. Very stable.

CALOL

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FREE CATALOG "How to Save Money on Equipment Operation," will be sent on request to Standard Oil Company of California, 225 Bush Street, San Francisco, California.

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STANDARD OIL COMPANY OF CALIFORNIA

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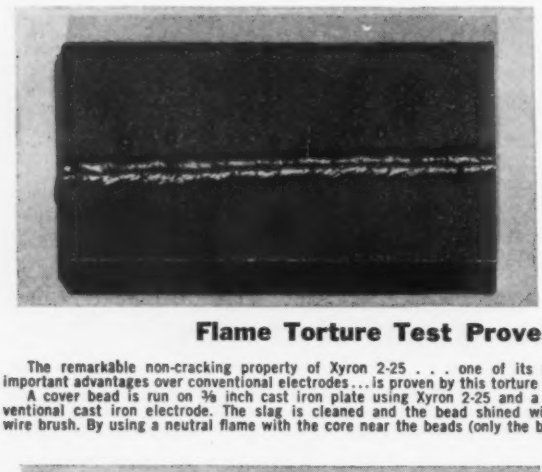
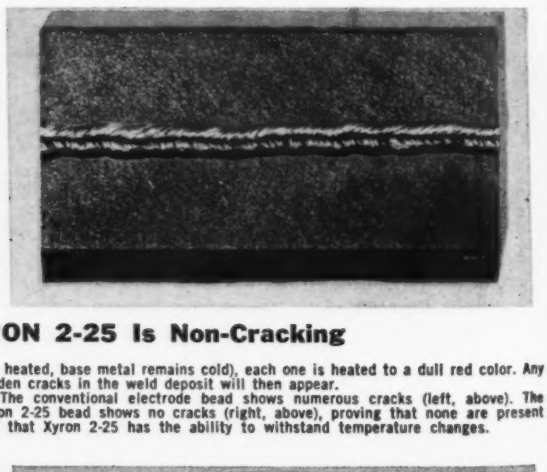
$3800 SAVED! When a transmission housing broke on a 60-ton U. S. Naval Yard railway crane, operations were suspended. The replacement cost of $3800 and a 6-month delay were saved with the Xyron 2-25 weldment illustrated. Careful tests proved the weld was completely free of cross checks and porosity.

Xyron 2-25 has been proven ideal for "cold" repair of large sections such as cracked motor blocks, machine bases, motor and gear housings. Xyron 2-25 makes it possible for the weldor to lay in large volumes of filler metal, run long beads without excessive heat build-up in the base metal. All the advantages of Eutectic's "Low Heat Input" welding process has been brought to the arc welding of cast iron.

$20,000 SAVED! When this $20,000 cast iron condenser crashed to the ground, the manufacturer expected to replace it completely or at best to stand an expensive and lengthy repair job. But, with Xyron 2-25 the entire repair was successfully completed in less than 100 hours. The repair was found to be entirely free of cracks and "leakers" and was accomplished without warping or embrittlement of the base metal. The weldors performing this job reported amazement with the faster, non-stop welding possible with this new Eutectic electrode.

NOW...CRACK-FREE with XYRON 2-25—Eutectic's new



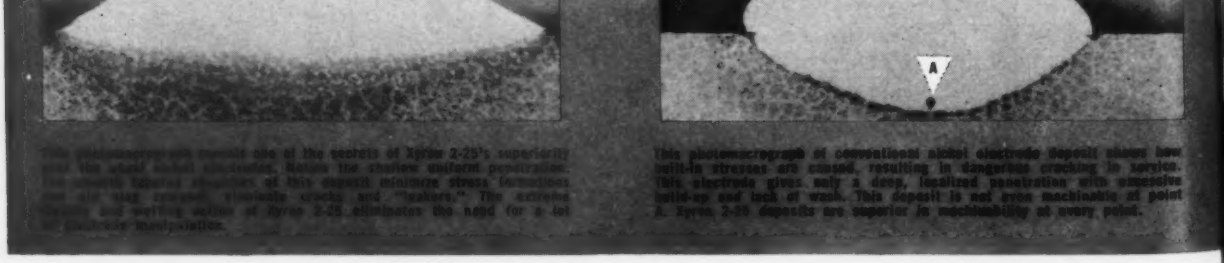


Flame Torture Test Proves XYRON 2-25 Is Non-Cracking

The remarkable non-cracking property of Xyron 2-25 . . . one of its most important advantages over conventional electrodes . . . is proven by this torture test.

A cover bead is run on ⅜ inch cast iron plate using Xyron 2-25 and a conventional cast iron electrode. The slag is cleaned and the bead shined with a wire brush. By using a neutral flame with the core near the beads (only the beads are heated, base metal remains cold), each one is heated to a dull red color. Any hidden cracks in the weld deposit will then appear.

The conventional electrode bead shows numerous cracks (left, above). The Xyron 2-25 bead shows no cracks (right, above), proving that none are present and that Xyron 2-25 has the ability to withstand temperature changes.



This photomacrograph reveals one of the secrets of Xyron 2-25's superiority over the plain nickel electrodes. Notice the shallow uniform penetration. The smooth tapered edges of this deposit minimize stress concentrations and aid slag removal. Unusually ductile, it withstands severe cracking tests. The arcing and welding action of Xyron 2-25 eliminates the need for a lot of puddling manipulation.

This photomacrograph of conventional nickel electrode deposit shows how built-in stresses are caused, resulting in dangerous cracking in service. This electrode gives only a deep, localized penetration with excessive build-up and lack of wash. This deposit is not even machinable at point A. Xyron 2-25 deposits are superior in machinability at every point.

Make This Comparison

EUTECTIC new 1955 DEVELOPMENTS

TECHNICAL ADVANTAGES	CONVENTIONAL NICKEL ELECTRODES	NEW NON-CRACKING EUTECTRODE XYRON 2-25
LOW HEAT INPUT	?	YES
NON-CRACKING	?	YES
CAN BE USED "COLD"	?	YES
CAN BE WELDED "NON-STOP"	?	YES
EASY MACHINABILITY	?	YES
HIGH TENSILE STRENGTH	?	YES
VERSATILITY	?	YES
EASY SLAG REMOVAL	?	YES
PERFECT COLOR MATCH	?	YES
LEAK PROOFNESS	?	YES

CAST IRON WELDING

strontium-aluminum bearing electrode

perfect for all types of gray and ductile cast iron including "Meehanite", "Ni-Resist" and joining cast iron to steel

Here's proof of the superiority of Eutectic's new Xyron 2-25. Just study the comparison chart above and you'll see that Xyron 2-25 gives you everything you want for faster, better welding. The case histories shown are typical of the reports by users all over the country, in extensive tests.

And, Xyron 2-25 is not just another conventional nickel alloy electrode. Its new strontium-aluminum formulation gives Xyron 2-25 higher weld quality and strength by purging the molten filler metal from harmful sulfur and sulphides, purifying it from oxide inclusions and improving the electrode's fluidity. All types of cast iron alloys such as Meehanite, Ni-Resist, and others, cast iron joined to steel, even old, dirty, and oxidized surfaces can be welded without preheating when you use Xyron 2-25. Not only does Xyron 2-25 save you time, but it also minimizes or eliminates the danger of warping, stress or embrittlement of the base metals.

The crack-free feature of this new electrode makes it ideal for the newest metals in the cast iron field. There is no weldable application for cast iron for which Xyron 2-25 cannot be recommended. It is the electrode every weldor has been waiting for.

FREE . . . new 16 page Eutectic Welder Magazine. See how one plant increased production joining 500% . . . read actual case histories of time and money savings on maintenance and repair . . . learn the welding procedures for perfect salvage jobs not possible with conventional welding materials. Just drop the coupon in the mail TODAY for this valuable book.

SEE A DEMONSTRATION — GET FREE GOGGLES

Your local Eutectic District Engineer is ready to show you, in your own shop, with your own materials, that Xyron 2-25 will out-perform any nickel cast iron electrode you may now be using. For letting him show you how Xyron 2-25 will let you make better welds at amazing savings in time and labor, he'll give you a pair of burn-resistant welding goggles with unbreakable frames and lenses. They're perfect for torch welding — and they're yours FREE — just for seeing a demonstration. Supplies are limited so make an appointment today with your local Eutectic District Engineer, or, use the coupon.

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This concentration of effort on one product is good reason for the *uniformity* of quality of Diamond Roller Chain, the great reserve strength, the longer life dependability that mean lower cost, improved product and output. The Diamond trade mark is synonymous with highest quality.

In your factory operations, Diamond motor drives hold production speeds at their maximum, and avoid power and output losses. There is practically no end to the applications of Diamond Roller Chains. Our engineering staff is ready at all times to make practical recommendations.

You will find 64 pages of useful information in Catalog 754. Copy on request.

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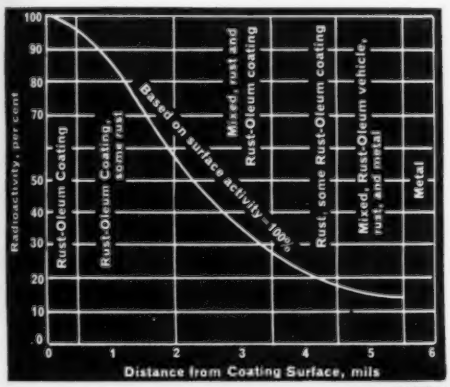
PENETRATES

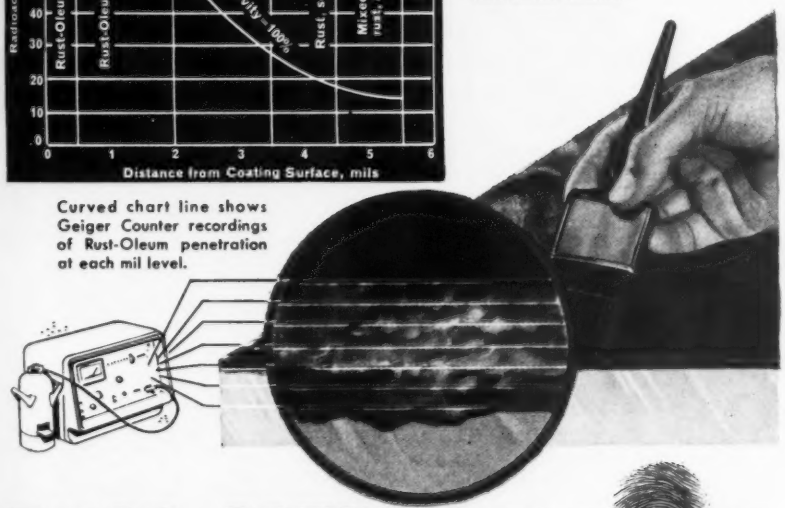
rust... *to bare metal!*

To stop rust, the vehicle of a protective coating, when applied over sound rusted surfaces, must *penetrate* through rust to bare metal. Rust-Oleum does exactly that—as proved by radioactive tracing! Rust-Oleum's specially-processed fish oil vehicle was radioactivated and formulated into Rust-Oleum 769 Damp-Proof Red Primer—then applied to rusted test panels. Penetration *through rust* by Rust-Oleum's specially-processed fish oil vehicle was then traced by Geiger Counter.

You stop rust, because Rust-Oleum's fish oil vehicle *penetrates* to bare metal and into the tiny pits where it drives out air and moisture. You save money, because you can apply Rust-Oleum directly over sound rusted surfaces—usually eliminating costly surface preparations. Attach coupon to your business letterhead for thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists.


Radioactivity, per cent
Distance from Coating Surface, mils
Based on surface activity = 100%
Rust-Oleum Coating
Rust-Oleum Coating, some rust
Mixed, rust and Rust-Oleum coating
Rust, some Rust-Oleum coating
Mixed, Rust-Oleum vehicle, rust, and metal
Metal

Curved chart line shows Geiger Counter recordings of Rust-Oleum penetration at each mil level.



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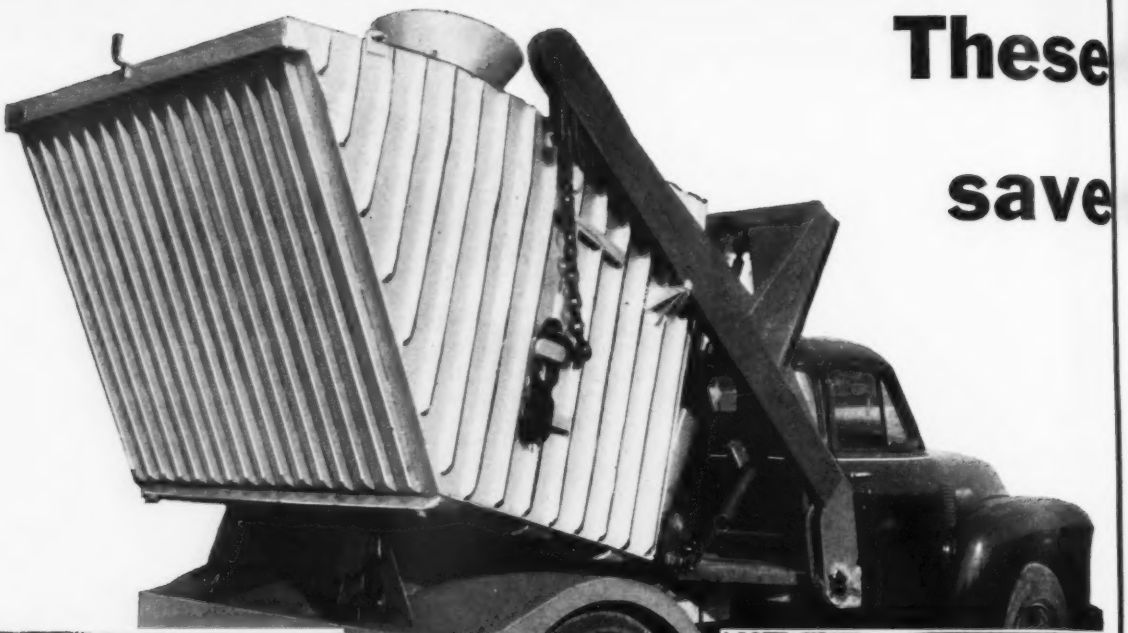
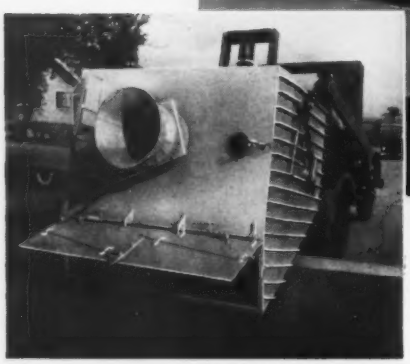
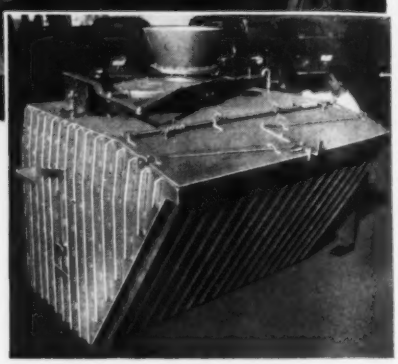


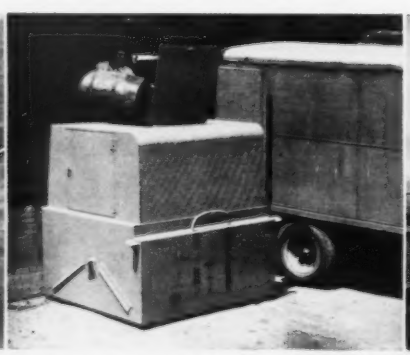


Dempster-Dumpster serving a 6 cu. yd. container with cooling fins for handling a high temperature product.

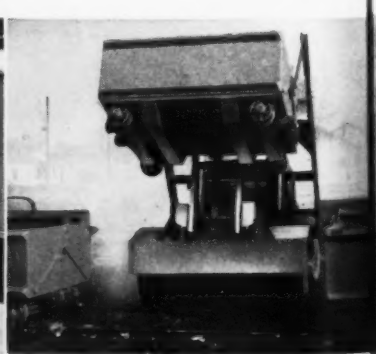


Here are a few of the hundreds of Detachable Containers we have built to solve handling problems of every description. A few others not shown include those with compartments . . . with insert containers . . . fully-insulated . . . lined with lead . . . lined with fire brick . . . with windows and doors . . . with casters . . . flat bottoms and open at one end . . . with teeth . . . with shelves for tools and supplies—and we could describe hundreds more, all served by one Dempster-Dumpster and only one man, the driver.

This 3 cu. yd. Container has skids for fork lift truck transfer.



10 cu. yd. Container widely used for refuse and combustible wastes.



Flanged wheel equipped containers for remote loading.

5176

DEMPSTER

4 manufacturers to $82,000.00 annually handling waste materials!

These four industrial plants expect to save, in labor costs alone, during the first five years service of the Dempster-Dumpster System—

A PLASTICS PLANT: $26,958.00 savings on an investment of $9,523.50 in Dempster-Dumpster equipment. Savings alone pay for equipment in two years.

A CHEMICAL PLANT: $204,076.75 savings on an investment of $40,968.00 in this equipment . . . savings pay for equipment in one year.

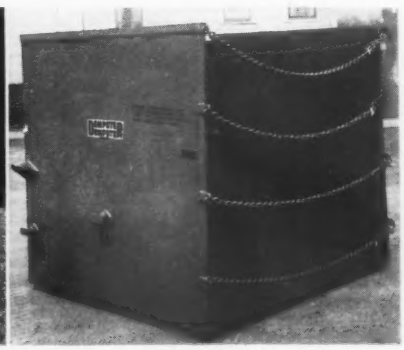
AN AUTOMOTIVE PLANT: $135,000.00 savings on an investment of $19,272.00 . . . savings pay for equipment in 9 months.

A PAPER AND PULP MILL: $43,104.00 savings on an investment of $10,750.00 . . . savings pay for equipment in 1¼ years.

Those are typical examples. Visualize a Dempster-Dumpster, operated by only one man, the driver, serving scores of big steel containers, one after another, in your plant. Containers of many designs and types, handling waste or salvable materials, raw or finished products, fluids including acids, combustibles, dusty materials—anything that can be handled in up to 21 cu. yd. detachable Dempster-Dumpster Containers . . . payloads up to 19 tons. Savings are tremendous! Take advantage of our free engineering service, which determines by fact-finding survey the cost cutting possibilities of this system in your plant. Dempster Brothers, Inc.

600 Gal. stainclad tank with brine cooling channels.

A Container available up to 10 cu. yds. with or without lids for many uses.



A 9 cu. yd. container for handling packaged products.

BROTHERS 516 N. Knox, Knoxville 17, Tennessee

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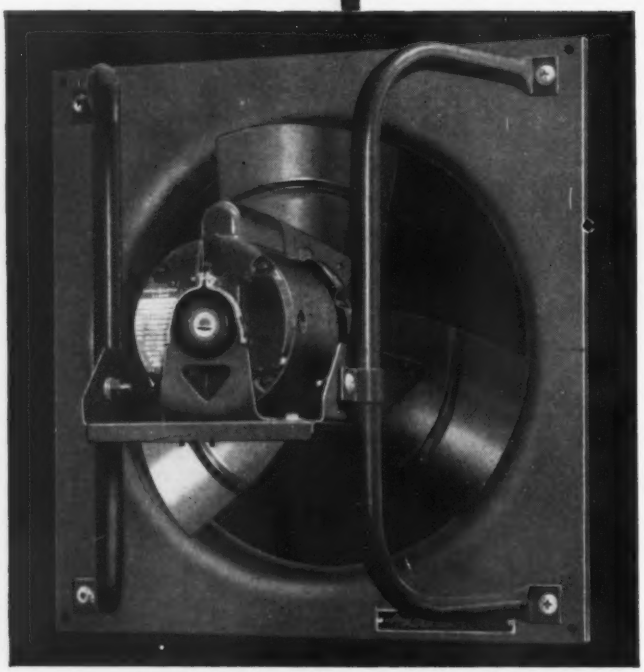
American Blower
Ventura Fans
offer you

top performance and economical ventilation



American Blower Model K Ventura Fan

You can count on American Blower Ventura Fans to do the job they are designed for, with high efficiency and a minimum of maintenance. They are built for long life and top performance. All ratings are certified.

American Blower Model K Ventura Fans are ruggedly constructed, heavy-duty propeller fans for tough industrial applications. They offer the power you need . . . when you need it, and will operate against static pressures up to 5/8". Request Bulletin 6514.

American Blower Ventura Fans are attractively designed, quality built, and easy to install . . . *yet competitively priced.* Ventura Fans come in a wide range of sizes and capacities — with constant-speed and two-speed direct drives, totally enclosed motors — to satisfy your exact requirements.

CERTIFIED RATINGS

Certified ratings are the result of tests made by the Manufacturer in accordance with the Standard Test Code for Centrifugal, Axial and Propeller Fans adopted jointly by the National Association of Fan Manufacturers, Inc. and the American Society of Heating and Ventilating Engineers.

AUTHORIZED BY
N A F M

Certified Ratings

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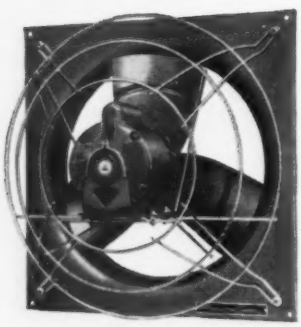

Model G Ventura Fans

Model G, at left, is a sturdily built and attractive fan suitable for light industrial duty and commercial applications. It is especially quiet-operating, making it ideal for offices, stores, and lobbies — or wherever quiet operation is required. Write for your copy of Bulletin 6414, which gives complete performance data.

American Blower products serve industry

Air Conditioning, Heating, Ventilating Equipment
Mechanical Draft Equipment
Industrial Fans and Blowers
Centrifugal Compressors
Gyrol Fluid Drives
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AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American Radiator & Standard Sanitary Corporation

AMERICAN 75th ANNIVERSARY YEAR 1881-1956 **BLOWER**

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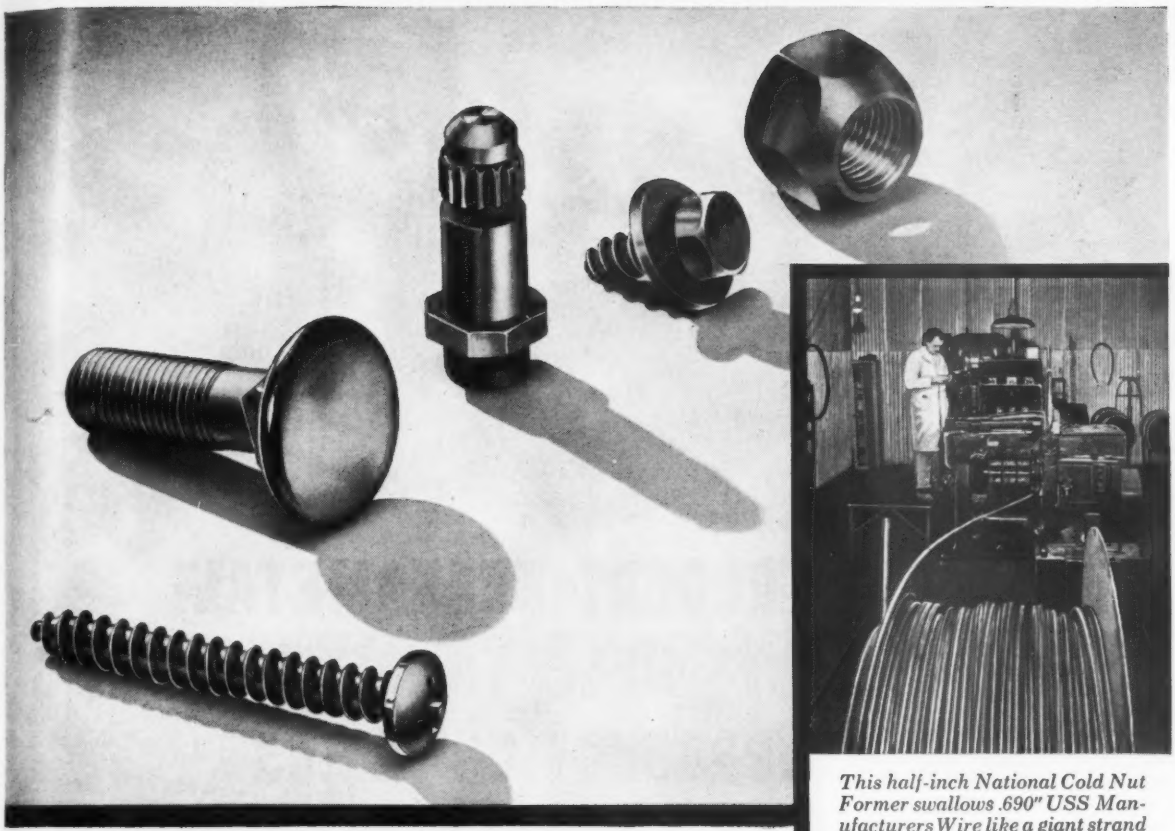

This half-inch National Cold Nut Former swallows .690" USS Manufacturers Wire like a giant strand of spaghetti. In five successive punches the machine forms a hexagon nut blank ready for threading. California Fasteners produce about a million hexagon nut blanks monthly at their Sonoma, California, plant.

Making bolts and screws requires special steel

If you own a Western-assembled Ford, your car is literally held together by California Fasteners. There are about 1300 standard bolts and screws needed to assemble a Ford. A big part of these needs are supplied Western assembly plants by CALFAST who make the 2" arm rest screw, bumper bolt, remote control door latch stud, body screw and wheel nut shown in the main picture above; from left to right.

CALFAST puts USS Manufacturers Wire to a series of severe tests in their thread forming and their cold heading operations. Yet rejects due to rough threading or split heads are practically nonexistent. California Fasteners gets the wire best suited to their needs—because the USS Manufacturers Wire they use is especially made for the production of bolts, rivets, screws, nuts, etc. USS Manufacturers Wire is available in more than 1,000 different types, grades and finishes to fit your own special needs.

Free wire gauge! WI-1

UNITED STATES STEEL CORPORATION
COLUMBIA-GENEVA STEEL DIVISION
120 MONTGOMERY STREET
SAN FRANCISCO 6, CALIFORNIA

Please send me your free wire gauge that's fast and simple to operate; gives accurate measurements.

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*Address*_____

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USS Manufacturers Wire

UNITED STATES STEEL

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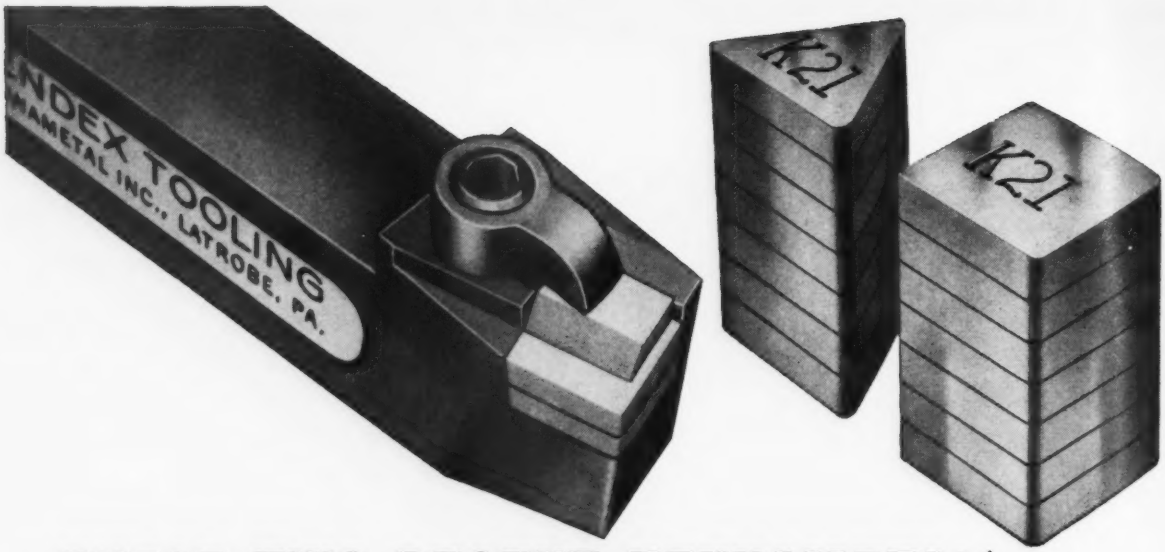


THESE TWO RECENT KENNAMETAL* DEVELOPMENTS HELP TO MEET TODAY'S HIGH-SPEED PRODUCTION NEEDS

The profit advantages of today's high-speed automatic cycling machines for metal cutting are lost when tools wear rapidly—need frequent regrinding—or are cumbersome to index.

Kennametal recently introduced two new developments to help give you continuous machine performance, and to help step up profits in your steel-cutting operations. These developments are Kendex*† Button Tooling and Kennametal Grade K21.

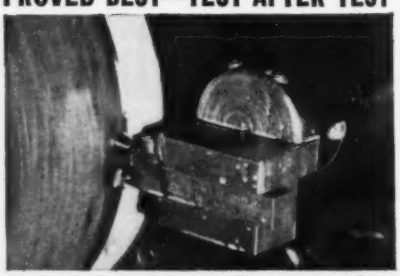
Kendex "turnover" inserts, with replaceable Kennametal shims and new chip control system, double the number of cutting edges, eliminate all regrinding and index in seconds. These features help provide consistent tool performance and hold downtime to a minimum.

Grade K21 is the General Purpose steel-cutting carbide now outperforming all other medium grades in the carbide industry. Superior performance of K21 is due to exceptionally high edge strength, strong resistance to cratering and superior wear qualities. An extremely versatile grade, K21 can be applied to general steel-cutting, heavy roughing and finishing.

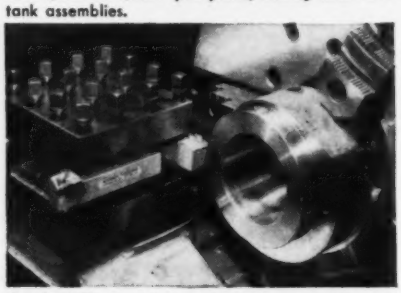
Kendex, in 17 styles and sizes; and K21, in popular blanks and inserts, are immediately available from stock. For their right application on your machining jobs, call a Kennametal Tool Engineer. He works exclusively with Kennametal . . . applying and servicing it. And be sure to ask for reports of Kendex and K21 repeat performances, job after job. KENNAMETAL INC., Latrobe, Pa.

*Registered Trademark †Patent applied for 9403

PROVED BEST—TEST AFTER TEST



Kendex Tooling with "turnover" inserts cuts tool cost from $1.20 to $0.09 per piece, turning SAE 4140 tank assemblies.



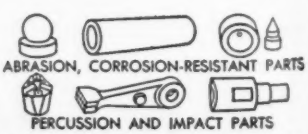
Grade K21—on interrupted cutting, roughed and finished 6 times as many pieces as other premium carbide.

Give your machines the tools they deserve . . . the BEST

MINING, METAL AND WOODWORKING TOOLS

WEAR AND HEAT-RESISTANT PARTS

INDUSTRY AND
KENNAMETAL
. . . Partners in Progress



ABRASION, CORROSION-RESISTANT PARTS

PERCUSSION AND IMPACT PARTS

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Colson cures

barrel-truck fatigue with

STRONGER BACKBONE FROM OSTUCO

First experimental models of Colson Corporation's barrel and drum handling truck strained, twisted and snapped under loads below their intended 1,000 pound capacity. Failures increased when the Elyria, Ohio, manufacturer tested trucks with heavy loads over rough surfaces.

Tracing trouble to the "Backbone" (the truck's main structural member), Colson and OSTUCO engineers got together, came up with a 1½" square formed seamless tube to solve the fatigue problem. Since 1947, the redesigned drum handling truck has been serving Colson customers, handling loads up to . . . and above . . . its capacity. Successful? Colson has yet to hear of one failure.

Take your cue from Colson. Quality, cost and production problems work themselves out when you talk them over with an OSTUCO engineer. It's easy to start the process by contacting a nearby OSTUCO sales office, or by writing direct to the Shelby factory.

Unique Single-Source Service at OSTUCO eliminates interplant shipment and error . . . another reason why your product can be improved when components are made from

OSTUCO TUBING

SEAMLESS AND ELECTRIC WELDED STEEL TUBING
—Fabricating and Forging

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company • **SHELBY, OHIO**
Birthplace of the Seamless Steel Tube Industry in America

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CANADA, RAILWAY & POWER ENGR. CORP., LTD.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
117 Liberty Street, New York 6, New York

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AIM* for high volume, production line packaging with fast Acme Steel Strapping Machines

Acme Idea Man John Everett, Los Angeles, introduced this strapping system to Graning Enameling Co.

Since the Acme Steel F1 Strapping Machine was installed at Graning Enameling Co., El Monte, California, *one man straps as many kitchen sinks and laundry trays as could be done before in two shifts.* That's a saving of eight man hours each day. (Idea No. S4-1) Sinks are put on wooden bases and rolled along conveyor to the strapping machine. *The F1 machine tensions, cuts and seals steel straps automatically.* The whole strapping operation is completed in seconds. Package weight is reduced. Dunnage is less.

You'll find the Acme Steel Strapping Machine has other valuable advantages. Ease of operation, less worker fatigue. The machine applies each strap with uniform tension insuring maximum product protection. Now, the speed of the F1 makes it possible for packing to keep pace with fast, large volume production.

Your Acme Idea Man has countless strapping ideas that point the way to profitable production line packaging. He will gladly and without obligation analyze your operations. He will demonstrate and recommend. Call him at the Acme Steel office listed in your classified directory. Or write Dept. HJ-16 for further information.

ask your *Acme Idea Man to help solve your problems

ACME STEEL PRODUCTS DIVISION

ACME STEEL COMPANY

4903 PACIFIC BOULEVARD, LOS ANGELES 58, CALIFORNIA • SAN FRANCISCO • SEATTLE • PORTLAND

ACME STEEL

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Pacific Telephone & Telegraph Company used

WROUGHT IRON PIPE for this Radiant Heating System

This radiant heating system, serving 22,500 square feet of floor area in Pacific Telephone & Telegraph Company's new warehouse at San Leandro, California, is an excellent example of the Company's insistence on durability. More than 16,300 feet of corrosion-resistant wrought iron pipe was used to safeguard the system against premature failure and costly repair.

The system, planned and designed by PT&T's Engineering Department, features some interesting construction details employed to protect the floor against damage from heavy fork-lift trucks and impact caused by bouncing reels of cable. After the 10-inch structural slab was poured, wrought iron pipe coils were laid in place. Over the pipe coils, a wire mesh was stretched to strengthen the concrete "topping" slab, and contribute to more even heat distribution. Then the pipe and mesh were covered with 3 inches of concrete. A metallic floor hardener was applied to the surface.

Architects for the project were Thomsen & Wilson, San Francisco. The system was designed by Harry S. Haley, San Francisco Consulting Engineer, in collaboration with Pacific Telephone & Telegraph Company engineers. The installation was made by Scott Co., Bay Area Mechanical Contractors.

Wrought iron pipe is ideally suited for this service because of its ease of installation, dependability in service. It takes short radius bends, without springback. It produces sound welds, free from pin-hole leaks. Its uniform structure assures sharp, full-depth threads. And because of its mechanical strength, wrought iron pipe withstands damage during installation. In service, wrought iron stays on the job longer, costs less per year.

Our bulletin, *Wrought Iron Pipe for Radiant Heating*, gives complete details, documents service records. Write for a copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. International Division: New York, N. Y.

Available throughout the world.

BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS

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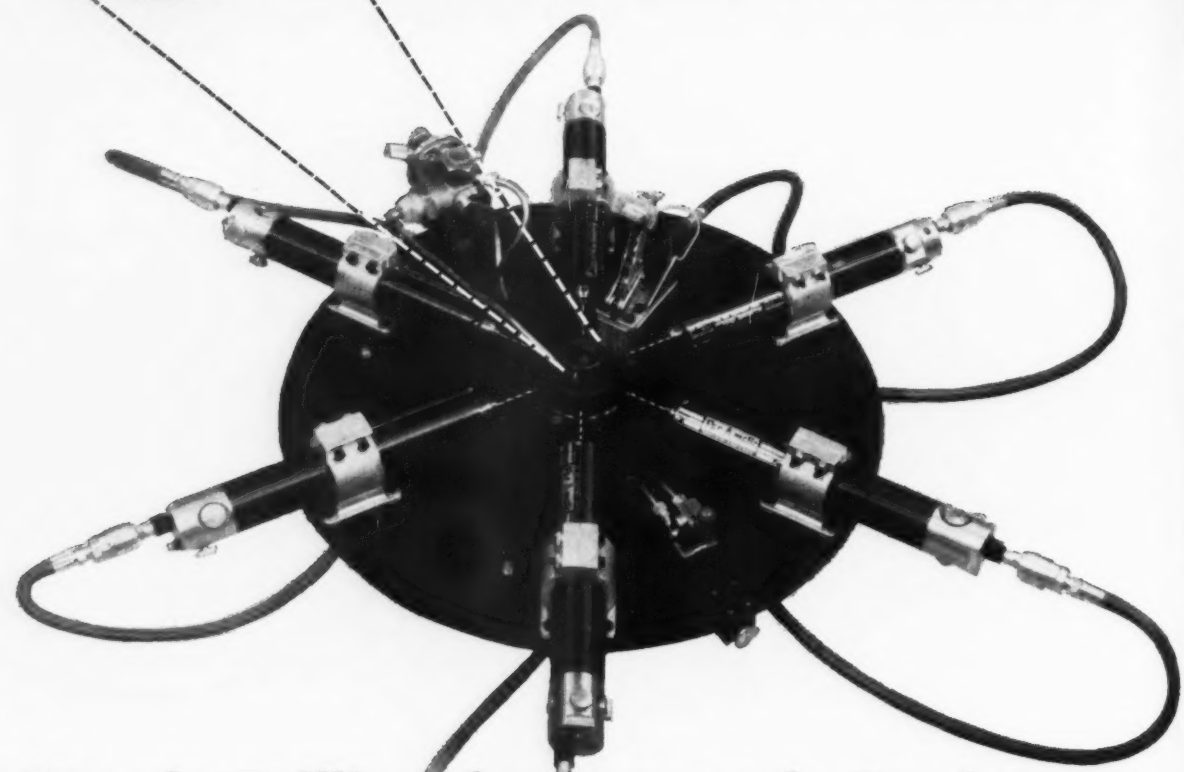
AUTOMATION WITH ARO PAR-A-MATIC DRILLS



Speeds Drilling for Tecumseh Products Co.

Drilling six holes at a time in a compressor piston with ARO Par-A-matic Drills helps Tecumseh Products Co., Tecumseh, Mich., increase output, reduce man-hours.

A group of Par-A-matics will drill any number of holes simultaneously . . . often in *less time* than would be needed for a single hole. Set-up adjustments are fast and easy. Air-operated . . . adjustable stroke length . . . variable rate of feed. ARO Field Engineers offer full assistance in planning multiple Par-A-matic installations. Write for bulletin 5546-T.

THE ARO EQUIPMENT CORPORATION
Bryan and Cleveland, Ohio
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ARO **AIR TOOLS**
Also . . . AIR HOISTS . . .
LUBRICATING EQUIPMENT . . .
AIRCRAFT PRODUCTS . . .
GREASE FITTINGS

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A SPECIAL WI REPORT

Western Outlook — 1956

The West grows fastest, its economy is the steadiest, its development offers the most new opportunities

By ARTHUR C. PRENDERGAST, Consulting Editor

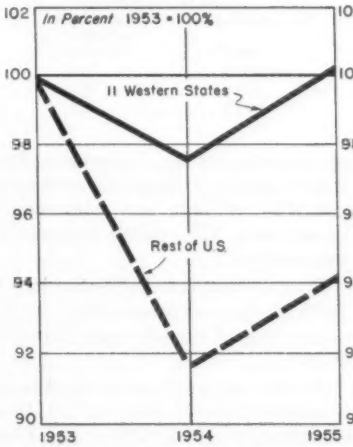
People make markets. The West got 26% of all population increase from 1950 to 1954 (2,801,000 more people in the West, 7,684,000 in the rest of the U. S.). WI predicted a year ago that California would pass New York for first place by 1965, some forecasters now say by 1960. West's 1954 population: 22,493,000. Estimated 1965: 30,438,000.

Markets make industry. 27% of building increase from first seven months of 1954 to same period of 1955 was in the West, which had 22.7% ($21.5 billion) of U. S. total permits in '54 period, 23.5% ($27.1 billion) in '55. In 1940 the West had 12.50% of the nation's personal income; in 1954 15.42%, the only area to make such a gain. California's per capita income in 1955 was $70 above 1954 and $400 above national average.

Highlights for 1956. Continued big population and diversified industrial growth for California. Pacific Northwest gets natural gas, opening up new industrial opportunities for an energy-starved area; continued construction demands should hold lumber, plywood, hardboard at high levels; pulp and paper output increasing; fantastic missile production promises big new plastics, aluminum market; aircraft backlog up $1 billion.

Of the manufacturing firms reporting in the Prudential Life Insurance Co. Western Business Forecast panel, 16% expected no change in the first quarter of '56 compared to the same period last year. The rest reported:

% change from 1955	Up	Down
31-40%	3%	1%
21-30%	12%	0%
11-20%	19%	3%
1-10%	30%	16%



WEST'S STABILITY PROVEN

The chart above shows clearly that the West suffered less of a decline from 1953 to 1954 than the rest of the country, and recovered more quickly. This is the same experience as in previous periods of fluctuation. The long-term migration westward keeps the West's economy in balance.

Manufacturing employment

11 Western states

Average monthly employment, 10 months, Jan.-Oct. inclusive 1953-1954-1955 (in thousands)

	1953	1954	1955
Arizona	28.4	26.7	30.6
California	1,065.1	1,044.5	1,095.2
Colorado	75.0	64.5	66.6
Idaho	23.7	23.6	24.2
Montana	18.3	17.9	19.1
Nevada	4.4	4.7	5.9
New Mexico	16.3	16.5	17.5
Oregon	145.5	135.1	143.9
Utah	32.4	31.1	32.4
Washington	189.2	196.9	201.1
Wyoming	6.5	6.6	6.3
Total, 11 Western states	1,604.8	1,568.1	1,642.8
Entire U. S. (first 10 months)	17,321	15,976	16,453
Percentage of entire U. S. represented by West	9.3%	9.8%	9.9%

Oil. A peacetime miracle! The West Coast's problem child, heavy fuel oil starts to behave. No sooner had multi-million-dollar refinery improvements been made to squeeze more high-test gasoline from heavy Western crudes, than unusually cold weather, plus unprecedented demands from power companies and a booming economy, ate up the top-heavy surplus and tipped the scales the other way—without a war to do it.

To restore balance, more California crude will be kept at home, and for the first time the Northwest will be independent, with General, Shell, and U. S. refineries on Puget Sound on stream.

West Coast refining capacity increased sharply in 1955, rising from 15.4% of total U. S. throughput capacity to 17%, nearly back where it was in 1947. The West's growing demand for power, about 90% of which comes from oil, is likely to keep the squeeze on supplies and force higher prices.

Aircraft. The Pacific Coast's aircraft industry enters 1956 with a backlog of more than $7 billion, more than a $1 billion increase over the backlog a year ago. Of this $7 billion, nearly $1¾ billion is for commercial jet and prop-jets.

Currently there are 235 turbo-jet or prop-jet aircraft on order, with additional orders for 150 in negotiation. Two of such transports will do the work of five present piston-engined craft, due to increased size and speed.

Present military programs indicate a downward trend in deliveries running into late 1957, when a maintenance level may be reached.

Dispersal programs refer only to future aircraft plant expansions.

Electric energy. Continued increase in load is being met in California by added steam capacity, but cheaper hydro in the Pacific Northwest still can be developed. The Federal Power Commission ended the controversial Hell's Canyon case by authorizing Idaho Power Co. to build three dams on the Snake River, and one of these dams is to be started this year. Congress has authorized starting construction of Ice Harbor, the first of four lower Snake River dams, which should supply 271,000 kw. by 1961, a big addition to Northwest supply.

The Federal Power Commission estimates Western energy requirements thus:

	In billions of kilowatt hours Pacific Northwest	Pacific Southwest	Total West
1954.....	42.1	44.8	86.9
1960.....	64.4	67.1	131.5
1965.....	82.5	91.2	173.7
1970.....	104.2	119.5	223.7
1975.....	129.0	151.5	280.5
1980.....	159.3	187.9	347.2

Industrial load is estimated as:

	Pacific Northwest	Pacific Southwest	U. S.
1954.....	19.6	14.8	206.2
1980.....	87.9	77.3	744.3

Gas. This year, probably by summer, the energy-starved Pacific Northwest will begin receiving 600 million cubic feet daily of natural gas from the West Texas-New Mexico area. Portland will be the first point reached, and Vancouver, B. C., will be served in 1959. Canadian gas is due in 1957.

Much additional industry will be stimulated, but electricity and oil for domestic use will not be seriously challenged immediately.

California gas companies expect to increase their imports of natural gas from the present 1.4 billion cubic feet daily to 1.75 billion by 1959.

Today's houses favor recessed wall heaters and central furnaces, discourage floor furnaces. Here are Pacific Coast Gas Assoc. figures of shipments by West Coast manufacturers:

	1955 (units)	Change from 1954
Vented wall heaters ...	228,849	+16,191
Floor furnaces	20,876	— 3,457
Central furnaces	132,471	+47,902
Water heaters	702,074	+34,254

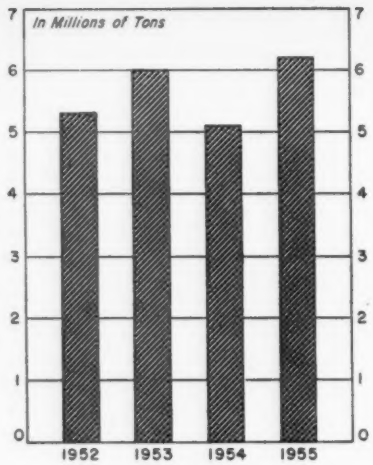
Atomic energy. Hanford is leveling off, Idaho Falls curving up. An eight-year expansion program has built up the AEC Hanford project into a $1 billion installation with a $67 million annual payroll for 11,000 workers, but Hanford is now settling into a normal operations routine, with only $5 million to $10 million construction in 1956.

At the National Reactor Testing Station at Idaho Falls, the operating level was increased one-third, to 40,000 kw. of heat; 325 fuel assemblies were contracted for; Congress authorized a prototype large ship reactor to cost $25 million; and construction began on a $15 million engineering test reactor.

For the fiscal year beginning July 1, 1956, design and construction are expected to total slightly more than $10 million.

At the Rocky Flats project near Boulder, Colo., operated by Dow Chemical, an $11.5 million expansion was started in 1955, to be mostly completed this year.

To be finished in March is a $2.8 million building project at the South Albuquerque Works of AEC, operated by ACF Industries, Inc. In the technical area at Los Alamos the work total was $3,407,000 in 1955; $5,748,000 to be done in 1956. Community construction in 1956 will total $2,873,000. At Sandia Lab $2,352,000 estimated construction is planned for this year.



MORE STEEL USED!

Steel mill product receipts

Seven Western states
(reported by Kaiser Steel Corp.)
millions of tons

1952	5.3
1953	6.0
1954	5.1
1955	6.2

INDUSTRIAL DEVELOPMENT

New plants and expansions

1954

So. Calif.	$272,554,000
No. Calif.	147,228,000
Total Calif.	$419,782,000
Portland metropolitan area ..	$21,000,000

1955

So. Calif. (L. A. county only) (11 mos.)	$228,703,000
No. Calif. (10 mos.)	159,635,000
Total Calif.	$388,338,000
Portland metropolitan area ..	$18,000,000

Steel. Replacing depleted inventories is expected to contribute considerable strength to the 1956 market. Flat rolled products are in particularly short supply. Record peacetime year in 1955 for consumption in seven Western states, estimated by Kaiser at 6,200,000 tons, exceeds by 600,000 tons 1953, when a substantial portion went into inventory. West Coast warehouse shipments were up 38% over 1954, with smaller decline in 1954 than national average.

Receipts of steel mill products by Western consumers, 5,197,000 tons, were 9% of national shipments.

Western tinplate constitutes 18% of national market, reflecting importance of Western canning industry. Plates are 13%, structural shapes, hot rolled bars and bar size shapes, standard and line pipe 10%, sheet and strip 4%. Sheet and strip have increased from 15% of Western market in 1951 to 18% in 1955, reflecting growth in manufacture of consumer goods and industrial equipment.

Southern California accounts for 40 to 50% of the total seven-state market, and demand for sheet and strip there is even higher, constituting 50% of the Western market.

Aluminum. Predictions: aircraft's huge consumption of light metal may be only a prelude to phenomenal aluminum tonnage in guided missiles, due to vastly larger provisions for it in defense budgets.

Aluminum production (pig) for the Pacific Northwest is estimated by Bonneville Power Administration as 535,000 tons last year; 485,000 tons in 1954; and 477,000 in 1953.

Production in 1956 will be somewhat higher if good hydroelectric conditions prevail. Anaconda Aluminum's new plant at Columbia Falls, Mont., will be in full production, while Kaiser is expanding its Tacoma Works and Alcoa its Wenatchee plant. Revere has project for reduction works at Wenatchee.

Chemicals. Tremendous markets for plastics and agricultural chemicals are mainly responsible for the West's $200 million total new plants (counting in fertilizer) completed or under completion in 1955. These include Standard Oil's 50-million-lb. isophthalic plant and Stauffer's new facilities.

Big volume ahead for 1956, such as Crown Zellerbach's 2-million-lb. "pilot" plant for solvents and other items from kraft black liquor, Du Pont's tetraethyl and sodium set-up, Shell's urea, Brea and Koppers' polyethylene, Carbide & Carbon's ditto, and three new ammonia plants.

Foundries. With business up about 25% in 1955, gray iron foundries on the Coast held their own somewhat better than some Eastern centers. Soaring metal prices are teaming up with fast-vanishing stockpiles of scrap to put a painful squeeze on the industry. Offshore movement of scrap in 1955 seemed likely to have topped the entire U. S. consumption for 1951.

Los Angeles welcomes a fume-free method of shell core making with a resin-type binder which dries almost instantly, so a core can be baked in only 20 to 30 seconds, plus closer tolerances, labor savings. Also nonsmog is a cold core hardening process best suited to nonferrous castings where carbon dioxide gas replaces baking.

New aluminum alloys of superior tensile and elongation properties are enabling foundries to guarantee definite properties within the casting, rather than merely warranting specifications of the test bar. This is vital in aircraft work. Foundrymen have finally succeeded in casting 220 alloy in a permanent mold.

Western castings shipments

(from U. S. Dept. of Commerce)
In short tons

	1953	1954	9 mos. 1955
Gray iron	752,093	705,153	513,340
Steel	121,903	102,507	76,871

Die casting. Aluminum and zinc die casting shipments in the West for 1955 broke all previous records, zinc nearly doubling 1954. New and diversified uses include streetlight reflectors, aircraft and automobile air conditioner components, electronic parts, builders' hardware, camera equipment, and a wide variety of machine and hand tools.

Western states shipments, 1950-55

(from American Die Casting Institute)
In thousands of pounds

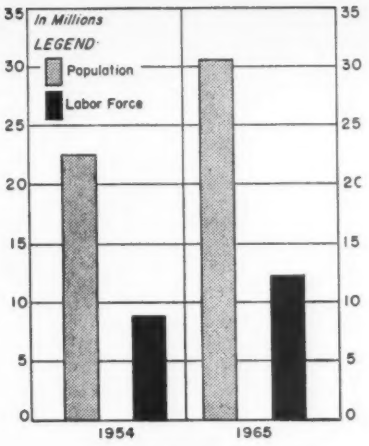
	Zinc	Aluminum	Other*
1950	7,500	6,250	1,800
1951	6,500	4,800	1,600
1952	5,600	6,500	1,450
1953	8,000	6,825	1,825
1954	6,725	7,400	2,050
1955**	10,950	8,250	2,775

* Revised
** Estimated based on 10 months actual

Rubber. Big doings, more ahead. Fantastic expansion in foam rubber is exemplified in U. S. Rubber's appropriating another $400,000 to double its year-old Santa Ana plant, reflecting soaring sales in auto cushioning and flat stock for furniture.

Goodyear topped tire output, sharply expanded Western curing plant. Several companies began using di-isocyanite process, simple as a cake mix: add water and it foams up to produce foam rubber with holes of desired size. Sticks to glass or wood, weathers well, resists ozone, can be mixed and poured right on the job, e.g. to heat-insulate box car interiors.

Shell's purchase of three wartime synthetic plants means making styrene and GRS rubber in one operation in one company. Such integration portends assured future supply of synthetic rubber at an economic price. With latex still tight, Goodyear and Firestone announced long-sought synthesis of natural rubber hydrocarbon.



A LOOK AT THE FUTURE

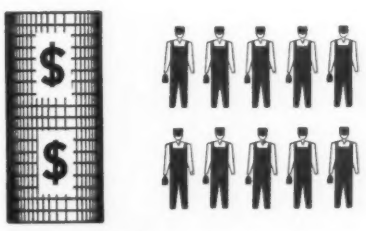
Population, 11 Western states
(from National Assoc. of Manufacturers)

1954	22,493,000
1965	30,438,000

Labor force, 11 Western states

1954	8,779,600
1965	12,154,000

Dairy products. Soaring California population boosts fluid milk demand (despite non-fat dry milk popularity), forces more butter and cheese production into Mountain states. Tank truck pick-up of milk from farms extending to manufacturing grades. Ice-cream output in West increased 11.23% from 1950 to 1954, ice milk (creamless ice cream) 55.4%.



MONEY AND MEN
(from National Assoc. of Manufacturers)
The West's expansion to 1965 will require:
$38,100,000,000 new capital
3,374,400 new jobs

Lumber. Almost 21 billion board feet of lumber were cut in the West in 1955, and 1956 is expected to go higher. The West Coast Lumbermens Assoc. estimates 9.7 billion for 1955 (an increase of one-third in the last 10 years), the Western Pine Assoc. 8.7, and the California Redwood Assoc. 2.5 billion, of which 950 million was redwood.

Home building is expected to decline slightly, with commercial, industrial and church keeping up, and schools perhaps getting a boost from Uncle Sam.

As for timber supply, 230,913 acres of tree farms were certified in 1955 by the Industrial Forestry Assoc. on the West Coast, and U. S. Forest Service estimates 620 billion feet of standing sawtimber in the western pine region, 140 billion above its 1945 estimate.

Pulp and paper. Per capita increase in paper consumption—415 lb. in 1955, 384 lb. in 1954—is demanding more output from Western plants. Latest pulp figures for the West: 3,124,325 lb. in 1953, 17.8% of the national total of 17,537,297 lb.

The West is now 50% self-sufficient in newsprint production, compared to 20% nationally. Western figures (estimated tons):

	1954	1955
Production	374,000	447,000
Consumption	811,000	851,000

Western states production of unbleached kraft paper for 1955 is estimated by the Kraft Paper Assoc. at 330,000 tons. As this is capacity, the additional 10,000 tons expected for 1956 will come from Crown-Zellerbach's new mill at Antioch, Calif., due to start next September.

Plywood. The West's 1955 plywood output was 4.875 million square feet, up 29.6% over 1954, Douglas Fir Plywood Assoc. estimates. For 1956, a gain of 15% over last year is expected.

A minimum of 11 new plants will be in operation by the end of 1956, making a total of 124 stretching from Bellingham, Wash., to Torrance, Calif. Possibly 11 more will be built.

Per capita consumption of plywood has increased from 10 ft. in 1946 to 29.6 ft. in 1955.

Frozen foods. $64,000 question: "Who eats all the frozen strawberries?" This item hit 115 million lb. in 1955, the eighth consecutive yearly increase. Although frost killed off nursery plants in Washington and Oregon, all three Coast states will show even greater acreage this year. Strawberry popularity makes it increasingly difficult to get farmers to plant broccoli, Brussels sprouts, and other desired vegetables.

Electronics. Figures tell the tale. In the Los Angeles metropolitan area, electronics industry billings for 1955 are estimated at $916,680,000; for 1956, $1 billion. On the San Francisco peninsula, $360,000,000 in 1955, and $1 billion by 1965.

These figures are from surveys by the Los Angeles and Palo Alto chambers of commerce. In the first area, manufacturing firms total 436, employment 72,167; in the latter, 54 firms and 11,000 workers. The Los Angeles area claims 12% of the nation's electronic firms, 14% of the employment, and 14.1% of the billing. Besides manufacturing firms, which occupy over 10 million square feet, the L. A. area has 229 firms doing research and development work, 24 engineering and designing firms, and 54 service and testing firms.

Instruments. Good example of accurate monitoring of fast-changing conditions through improved electronic measuring instruments is Shell Oil's process to continuously sample oil well output for water content through remote control. This is indicative of trend toward automatic logging in many industries. There is a noticeable trend in power plants toward less sophisticated control systems, where elaborate controls previously were overemphasized.

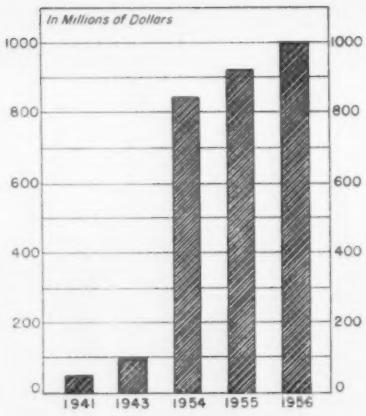
Porcelain enamel. West Coast production figures are not available. From coating "hot parts" of jet engines the next step is current Air Force experiments on guided missiles and supersonic aircraft, where smooth, glass-like surfaces cut down heat-producing friction.

Plastics. Colossal quantities may go into guided missiles if materials can be improved to meet stringent specs, because air would be filled with swarms of such missiles at an enemy's approach. Modern plane may use 500 lb., but ground-to-air missile with major structural elements of plastic would use 600 lb. or more.

This may not happen in 1956, but the new DC-8 has three times as much reinforced plastics as the DC-7; same sharp trend prevails in succeeding models of jet fighters. Epoxies are sweeping the field, fast replacing polyesters and phenolics.

Commercial usage, like automobile bodies, trailers, boats, grows. Plastic pipe is expected to reach maturity in 1956 and become full-scale competitor of steel.

The West is becoming more self-sufficient in raw materials, with Dow's styrene plant, Union Carbide's polyethylene, and Oronite's isophthalic coming on stream. Eastern material and machinery manufacturers are opening more offices of their own on the Coast, indicative of the industry's growth.



THE WONDER BOY

Electronics billings in Southern California

(reported by Los Angeles Chamber of Commerce)

1941	$47,000,000
1943	$95,000,000
1954	$842,000,000
1955	$917,000,000
1956	$1,000,000,000

(Editorial)

CALIFORNIA NEEDS A CENSUS

California needs an interim census, by actual head count, midway between each U. S. Census, to keep its planning straight. The state is growing so fast that projections from the federal 1950 figures are not dependable, and it will be the same story after 1960.

Two agencies in the state now forecast population yearly, but although both work from 1950 data their figures don't match up. California Taxpayers Assoc. estimates January 1, 1954, at 12,378,500; 1955 at 12,805,000; and 1956 at 13,465,000. State Department of Finance uses a July 1 peg, as follows: 1954, 12,595,000; 1955, 13,035,000.

For Los Angeles County, California Taxpayers says: 1954, 5,005,900; 1955, 5,186,000; 1956, 5,473,000. State Department of Finance says: 1954, 5,016,200; 1955, 5,176,000.

These discrepancies make it extremely difficult to plan effectively for public and private facilities.

Canning. Pears have shown the greates percentage increase in canned frui in the last 10 years, reaching an 8 million case peak in 1955, due to goo weather and new Northwest acreag

Nearly one-fourth of the 1955 clin peach pack utilized the new Filpe pitter; in 1956 three times as ma canners will use these machines, an the greater recovery of raw materi permitted may eventually lead to low canned cling prices.

Mergers are due to continue, b more in the line of picking up sma plants to round out an operation tha big combines.

Northwest salmon and halibut pac continue short; packers are organi ing a publicity campaign to comb the inroads of logging, pulp, alum num, and chemicals on spawnin streams. California tuna packers i creased their output in 1955 despi increasing imports and an eight-wee strike; promotion campaigns ma boost 1956 higher.

Uranium. Mining in 1956 may doubl 1954 production and will show sub stantial increase over 1955. Virtuall all existing facilities are being en larged, and new mills are due for early completion. Several large de posits in New Mexico, Utah, and Colo rado will go into full-scale production Guaranteed price will soon be ex tended far beyond current March 1962 deadline. Uranium companies them selves are diversifying into production of gold, silver, mercury, tungsten, oil and gas.

Tools and dies. Southern California ex pects 1956 to be a banner year; 1955 volume was good, but profits coul have been better; employment in creased in last quarter. Although air craft will account for the bulk of 1956 increase, automotive people are ex panding facilities, and civilian outpu generally is on the up.

Furniture. Some factories are on two shift basis, and all indicators point up due to the West's bumper crop of new homes. Western companies invading the East are more successful, and 1956 may be competitively easier when Southern producers must adjust to the new $1 minimum wage.

Clay pipe. Vitrified clay pipe output on the Pacific Coast for 1955 is estimated by the Clay Pipe Institute as above 300,000 tons, a new high, with 1956 expected to be as good or better. Re equipping of plants is active.

Fertilizer. Sales in California were up 20% for the first three quarters of 1955, and a million-ton total for the entire year was forecast by the California Fertilizer Assoc.

DRUM SWITCHES
with that QUALITY look...
that are QUALITY

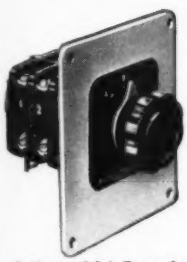
Bulletin 350 Style B Master Drum Switch with cover removed to show contacts

Bulletin 806 Style C Drum Switch for surface mounting

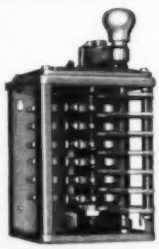
Bulletin 806 Style B Transfer Switch in Type 1 enclosure

Bulletin 350 Drum Switch in Type 4 watertight enclosure

Master Switches • Transfer Switches • Instrument Switches in Various Mountings and Contact Arrangements



Bulletin 806 Transfer Switch for flush mounting.



Bulletin 365 Drum Switch for manual speed control of multispeed a-c motors, with cover removed to show stationary and drum contacts.

Drum switches are sometimes the simplest and lowest cost units for handling sequence control . . . or for monitoring a group of indicating instruments. Often drum switches are the best answer for reversing service or for speed control of variable speed a-c motors.

The Allen-Bradley line of drum switches includes such a broad range of types and sizes that practically any requirement can be satisfied. Silver alloy contacts of simple design . . . good contact pressures . . . rugged construction . . . assure long, trouble free life.

Though low in cost, Allen-Bradley drum switches are a QUALITY product. Write for A-B Handy Catalog.

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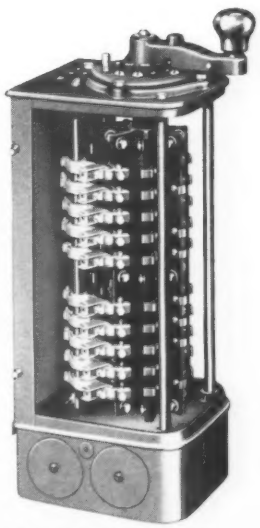
BULLETIN 350 STYLE A REVERSING DRUM SWITCHES

Style A Reversing Drum Switches are designed for across-the-line starting and reversing of small squirrel cage motors. Can be used for single phase motors, and for d-c shunt and compound wound motors. Will handle a-c single phase motors up to 1½ hp, 220 v; polyphase motors up to 2 hp, 220-440-550 v; and d-c motors up to ¼ hp, 115-230 v.



Bulletin 375 Drum Controller for speed control of slip-ring alternating-current motors.

1-56-M

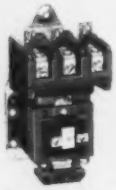
A-B Quality

The Sign of QUALITY Motor Control

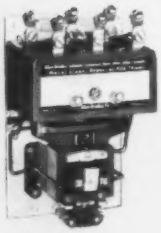
ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

ALLEN-BRADLEY
A-C CONTACTORS

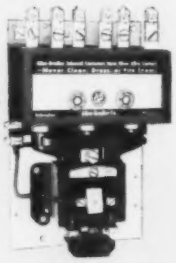
2 pole—Size 00
10 ampere



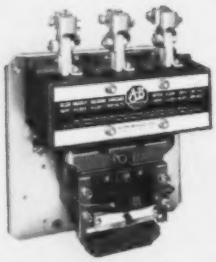
3 pole—Size 1
25 ampere



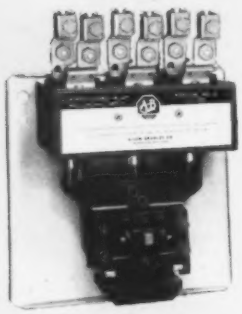
3 pole—Size 2
50 ampere



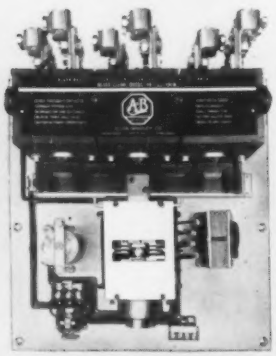
3 pole—Size 3
100 ampere



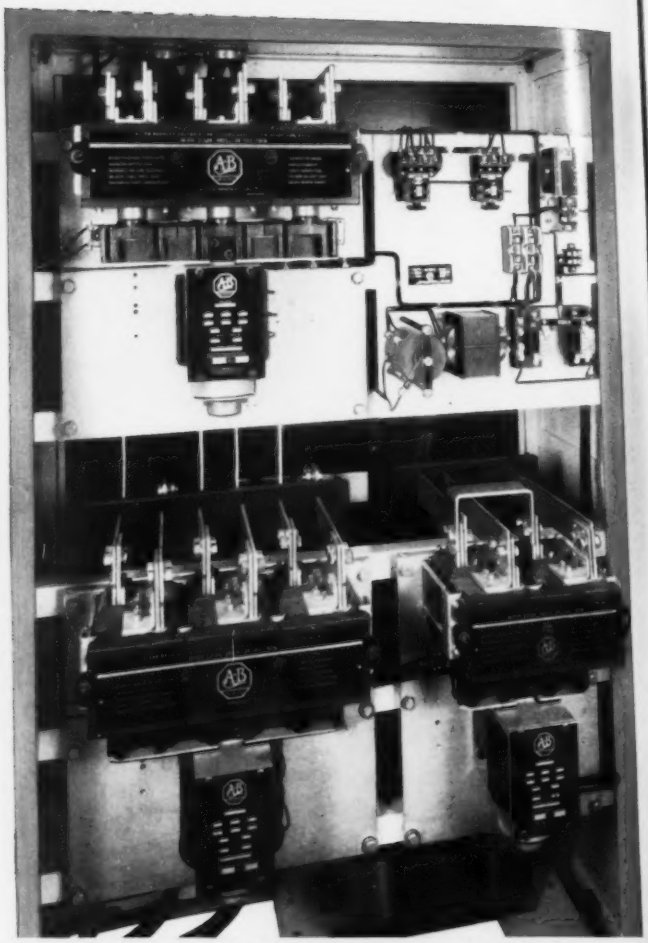
3 pole—Size 4
150 ampere



3 pole—Size 5
300 ampere



3 pole—Sizes 6 & 7
600 & 900 ampere contactors



250 Hp, Bulletin 746 automatic autotransformer showing Allen-Bradley Size 7 contactors

A-C and D-C CONTACTORS

10 to 900 Amperes

with Double Break, Silver Alloy Contacts

The only complete line of solenoid contactors on the market. Allen-Bradley offers nine sizes...from Size 00 (10 amperes) to Size 7 (900 amperes), one to four poles.

There is no contact maintenance . . . no pins, pivots, or bearings to give trouble. Just one moving part—the simple solenoid plunger. Operating characteristics are consistent for all nine sizes.

Enclosures can be supplied for general purpose, water-tight, dust-tight, and explosion-proof service.

Allen-Bradley controls are an added sales asset to any machine. May we send you our catalog?

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SOLENOID CONTACTORS
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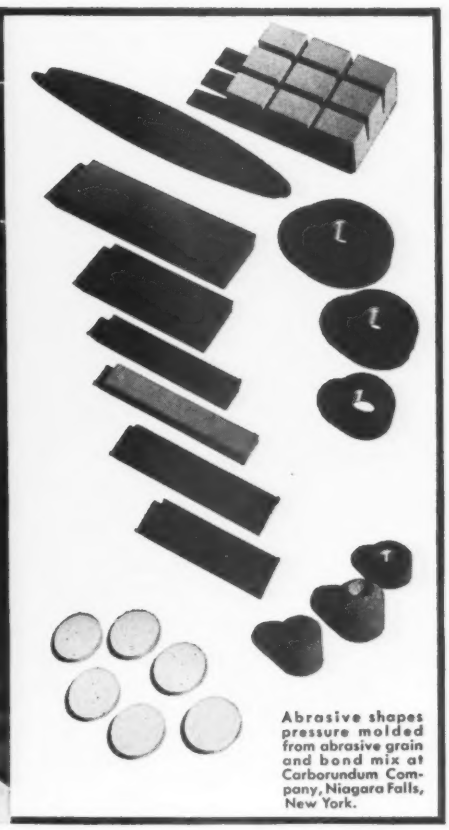
1-56-MR

Molding abrasives 50% faster with

DENISON *MULTIPRESS*®

with no downtime



Abrasive shapes pressure molded from abrasive grain and bond mix at Carborundum Company, Niagara Falls, New York.

PRODUCTION here has been increased 50% in molding of abrasive shapes. On operations requiring both molding and cutting, production is increased over 100%.

The operation is semi-automatic . . . the operator has only to remove the molded shapes.

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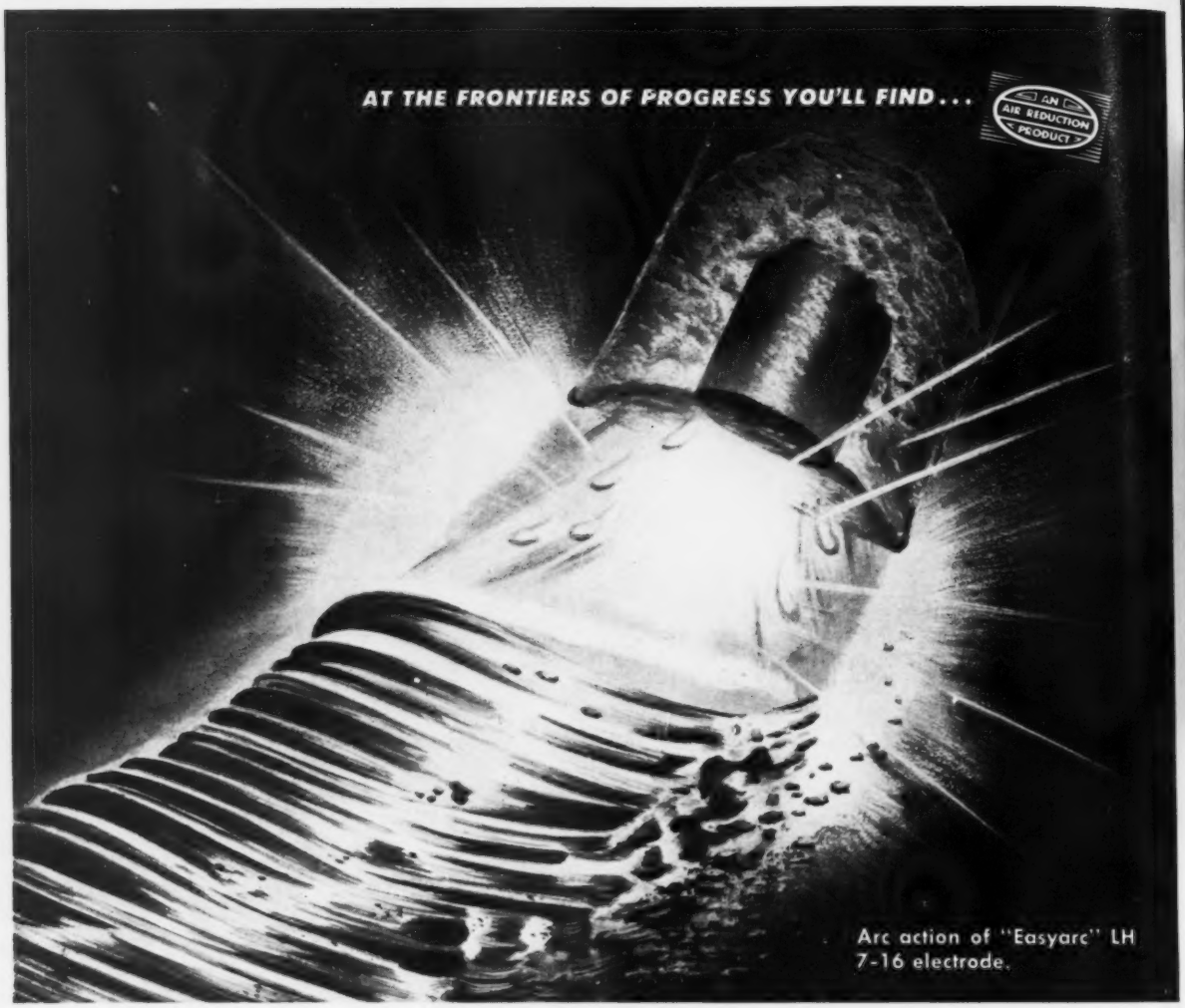

New "Easyarc" LH 7-16 deposits 60% more metal!

In comparative tests the new EASYARC LH 7-16 electrode deposited 6.58 pounds of metal per hour! This is actually 61.3% more metal than conventional low hydrogen electrodes of the same diameter.

Here's how the new EASYARC LH 7-16 does it:

(1) The concave end of the electrode concentrates the arc energy.

(2) Powdered iron coating melts and becomes an integral part of the weld.

(3) The extra-heavy coating helps control arc action and allows higher currents to be used in complete safety.

In addition to speed, the new EASYARC LH 7-16 produces outstanding results with hard-to-weld steels where highest quality is essential. Welds prove to have superior stretch and toughness characteristics. There's no underbead cracking. It's safe, too! The thick powdered metal coating is designed to eliminate the possibility of accidental arcing.

Let the new EASYARC LH 7-16 prove itself. Send for a *free* sample electrode today. Contact your nearest Airco office, Authorized Airco Dealer or write to Airco at the address below.

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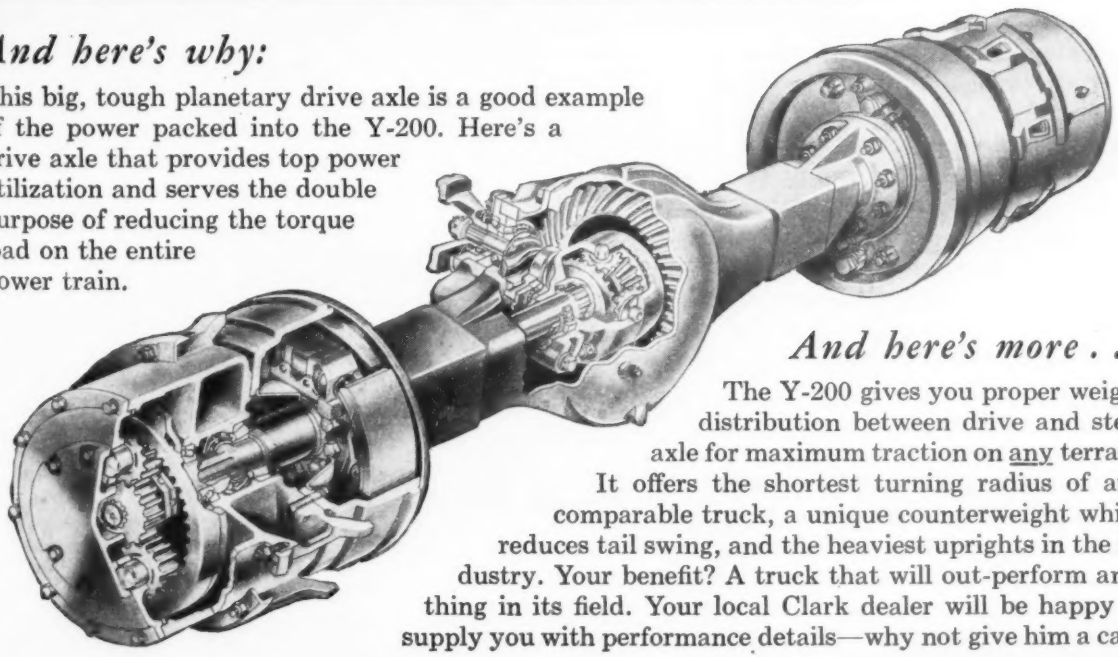
Anywhere in your yard...

Clark's Y-200 just doesn't stop!

And here's why:

This big, tough planetary drive axle is a good example of the power packed into the Y-200. Here's a drive axle that provides top power utilization and serves the double purpose of reducing the torque load on the entire power train.



And here's more . . .

The Y-200 gives you proper weight distribution between drive and steer axle for maximum traction on any terrain. It offers the shortest turning radius of any comparable truck, a unique counterweight which reduces tail swing, and the heaviest uprights in the industry. Your benefit? A truck that will out-perform anything in its field. Your local Clark dealer will be happy to supply you with performance details—why not give him a call?

MARK YOUR CALENDAR: MATERIAL HANDLING SHOW, JUNE 5-8, CLEVELAND, OHIO

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REVOLUTIONARY NEW SMOOT-HOLMAN

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LUMINOUS INDIRECT LUMINAIRE

Using New 800 Milliampere Lamps

Totally new in conception, design, performance. Takes full advantage of the high output of new 800 MA., rapid start lamp. The only indirect luminaire available that *mounts within 12 inches of ceiling without severe light blocking.* Slender lines and open construction pass amazing percentage of upward light back to work surface . . . Gives you *far more light per dollar* than ever thought possible. Louvering effect of fixture subdues ceiling brightness. No pronounced ceiling pattern. Faultless light distribution; its comfort and quality astonishes everyone.

By all means, investigate this exciting new fixture promptly. The more you know about it, the more use you'll find for it. Its possibilities are limitless. Where shall we send your complimentary file of technical data? Kindly mention this publication and our catalog number, PV-288.

Features

- **Upward and downward light balanced for best seeing.**
- **High efficiency.**
- **Brightness meets ASA school lighting standards.**
- **Mounts within 12" of ceiling without blocking return light.**
- **Near perfect visual comfort in any size room.**
- **High adaptation level yet low brightness and brightness ratios.**
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how to "slenderize" your forgings and save

have an Amforge Analysis made and keep weight and machining to a minimum

On an order for 25,000 gear blanks (half section shown), AmForge saved 20 tons of steel, high freight costs and heavy machining expenses compared to the former method of forging which resulted in a solid hub as well as no reduction in diameter between the collar and the gear proper.

How? AmForge analyzed the problem from the same blueprint and specifications that had been used for the old method but AmForge showed the customer that this piece could be adapted to its modern upset method.

When the forging was delivered to the customer, not only did he gain these tremendous savings but he got a better forging as well. It showed a denser structure and greater resistance to distortion in heat-treating operations due to a radially upset grain. This also gave all gear teeth a uniform, maximum strength.

This is just another example of how AmForge has been able to find savings for its customers through an AmForge Analysis. With its modern upset and press forging facilities at Azusa, California, AmForge offers its forging "know-how" plus the added advantage of lower freight costs to West-Coast manufacturers.

Satisfy yourself as to whether you can save with AmForge by sending in a blueprint, sketch or sample for an AmForge Analysis—no obligation, of course.

AMERICAN Brake Shoe COMPANY

AMFORGE DIVISION

155 N. WACKER DRIVE, CHICAGO 6, ILLINOIS

PLANTS: AZUSA, CALIFORNIA • CHICAGO, ILLINOIS

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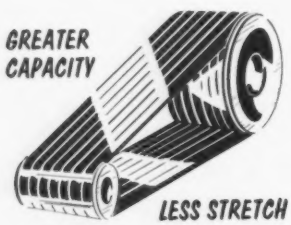

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Very flexible, high-capacity V-Belts with so little stretch that the efficiency of the drive is not affected. Built with larger grommets, having 40% more tensile strength, their ability to transmit greater HP means fewer belts per drive, reduction in over-all weight, and less space required for any given load. The over-size twin grommets are endless . . . no intermediate overlapping or splicing. That's why "Power King" belts are much stronger, stretch less, carry greater loads and last 20 to 50% longer.

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CALENDAR OF MEETINGS

JAN. 18—Western Labor Management Relations Conference, Fairmont Hotel, San Francisco. U. S. and California State Chambers of Commerce, sponsors. Contact James D. Gofourth, Calif. State C. of C., 350 Bush St., San Francisco.

JAN. 24-27 — American Management Assoc., general management conference, Fairmont Hotel, San Francisco. Contact Assoc. headquarters, 330 W. 42nd St., New York.

JAN. 30-31—Industrial Economics Conference, sponsored by Stanford Research Institute, Statler Hotel, Los Angeles. Contact P. J. Lovewell, conference chairman, Stanford Research Institute, Menlo Park, Calif.

FEB. 2-3—Manufacturing Section, Governor's Industrial Safety Conference, Fairmont Hotel, San Francisco. Contact Michael Flagg, editor, California Safety News, State Department of Industrial Relations, 965 Mission St., San Francisco.

FEB. 3-4—8th Annual Industrial Engineering Institute, sponsored by University of California, Berkeley and Los Angeles campuses (simultaneous sessions). Contact Department of Conferences, Univ. of Calif., Los Angeles 24 or Berkeley 4.

FEB. 20-22—National Standard Parts Assoc., Hotel Mark Hopkins, San Francisco. Contact J. L. Wiggins, executive vice president, 8 South Michigan Ave., Chicago 3, Ill.

MAR. 18-21—American Society of Mechanical Engineers, spring meeting, Multnomah Hotel, Portland, Ore. Contact ASME headquarters, 29 W. 39th St., New York 18.

MAR. 22-23—Annual spring conference of engineering and operating sections, Pacific Coast Electrical Assoc., Sheraton-Palace Hotel, San Francisco. Contact E. F. Perkins, PCEA, 681 Market St., San Francisco.

MAR. 26-28—Intermountain Logging Conference, Davenport Hotel, Spokane, Wash. Contact Charles Keim, Bigfork, Mont.

MAR. 27-APR. 2—Society of the Plastics Industry, 13th annual Pacific Coast Section Conference, St. Francis Hotel, San Francisco, and SS. "Lurline" to Honolulu. Contact Society headquarters, 67 W. 44th St., New York 36.

MAR. 30-31—Joint spring meeting of Western Section of Operations Research Society of America and Los Angeles Chapter of Institute of Management Sciences, sponsored by University of California Extension and Department of Engineering. Contact offices of U. of C. Extension, Engineering, Los Angeles 24.

APR. 5-7—8th Biennial Electrical Industry Show, sponsored by Electrical Maintenance Engineers Assoc., Shrine Exposition Hall, Los Angeles. Contact Show headquarters, 3443 So. Hill St., Los Angeles 7.

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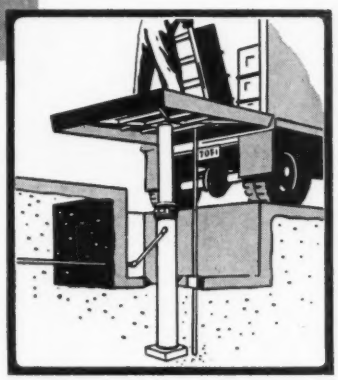

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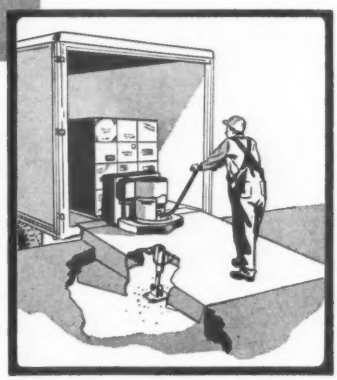

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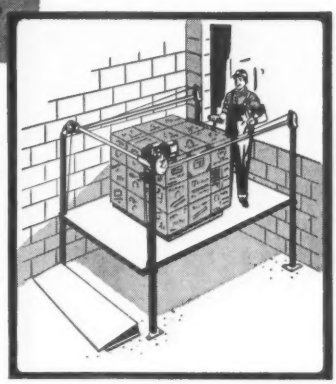

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Steel windows appeal to builders and contractors because they are easily installed. Fenestra windows are supplied either hot-dip galvanized and bonderized or bonderized and prime-painted.

Sturdy, easy-to-install windows made from STEEL

More and more windows these days are made from steel. The attractive, slender frames and muntins are ideal for homes, plants, hospitals and other buildings where maximum light and ventilation are important. The rugged steel frames can withstand rough treatment during shipment. And they are easy to install because they come factory-assembled.

The various types of steel window sash are just a few of the many sections we roll at our three West Coast steel plants. We're bar specialists. So be sure to check with us when you need carbon or alloy grades in either standard or special sections. All bars are rolled from new-billet steel, uniform in size and quality. Call our nearest sales office.

Bethlehem Pacific steel sections are sheared to accurate lengths in the Detroit Steel Products Co. plant in Emeryville, Calif. Their "Fenestra" line includes 270 types of window sash.

These craftsmen are gilding fine china, intricate work that calls for plenty of natural light. Only steel windows have the strength to permit the use of such slender framing members.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: Los Angeles, Phoenix, San Francisco, Portland, Seattle, Spokane

BETHLEHEM PACIFIC

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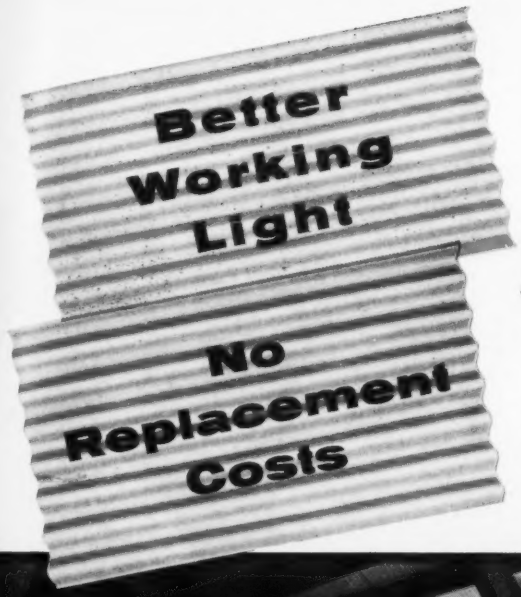

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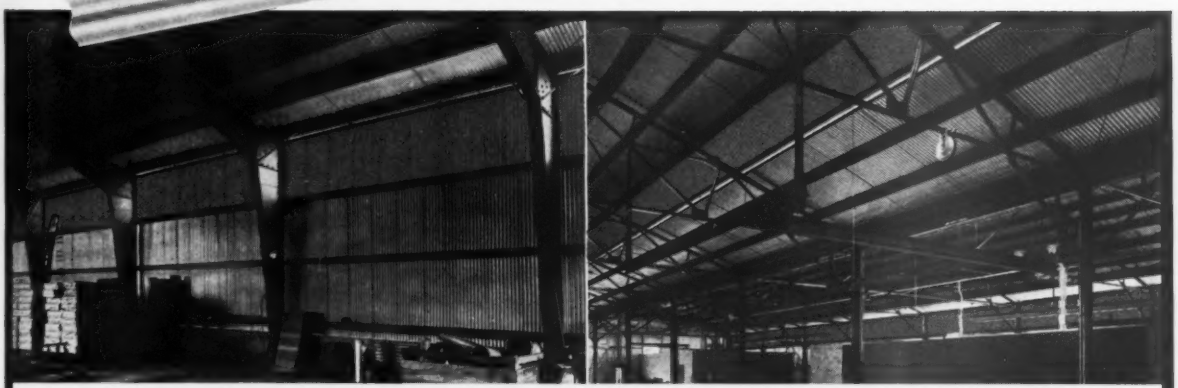

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What's Ahead in Steel Service

Many new products and service facilities have been added at Ryerson during the past few months. Many more are in prospect for '56. Here's a review and a look ahead:

NEW STEELS—Three new Ryerson leaded alloys—Rycut 20, Rycut 40 and Rycut 50, were introduced during the past year. Additional sizes of these amazingly fast-cutting alloys have recently been added to our stocks—further additions are in store. Leaded plates, available only at Ryerson, have just been introduced and these New E-Z-Cut plates soon will be on hand in larger tonnages. Other recent additions to Ryerson stocks: Stainless plates and sheets in extra large sizes, welded pump-cylinder tubing, mansard pattern siding in stainless, galvanized and carbon steel, 8615 alloy steel plates for case hardening applications.

NEW SERVICE FACILITIES—Ryerson service facilities are never completed—modernization and expansion go on continuously. A few 1955-56 examples: a brand new Connecticut plant, additional facilities doubling stock and service capacity at Boston, a 30% increase in facilities at Buffalo, new cut-to-length lines at New York and Boston, greatly augmented shearing equipment at Chicago, more plant area at Los Angeles, Detroit and Spokane.

NEW QUALITY PROTECTION—Now, in 1956, still more stringent quality controls are going into effect—giving you added assurance of predictable steel performance every time. And these new controls supplement an existing program of quality checks and counter checks already considered exceptional throughout the metal-working industry.

STEPPED-UP DELIVERIES—Even under the pressure of current demand, a high per cent of all regular orders for steel from stock are shipped within 24 hours—practically all within 48 hours. With expanded facilities we confidently expect to do even better in 1956!

You have helped to make 1955 another year of great progress for Ryerson. We believe we can best show our appreciation by continuing to improve our ability to serve you in the year ahead.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets & strip, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

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January 1956 Vol. XXI, No. 1

Western Industry

Cost reduction—an important part of foresight

WESTERN FIRMS have been understandably, but unfortunately, lax in the efforts they have devoted to setting up effective cost reduction programs.

There is good reason. Market demands for industrial and consumer products have consistently outstripped the West's productive capacity during the last decade and a half—during the 40s, in supplying an important share of the country's war materiel; later, to satisfy the demands generated by the heat of conflict in Korea and the chill of international tension; and now, in frantic effort to satisfy pent-up demands resulting from the West's explosive population growth. Hundreds of small firms, and many large ones, branch and native, have rushed new facilities in the West and hurriedly set up production lines to meet the mushrooming challenges and opportunities offered by the insatiable Western market (see p. 19).

This was undoubtedly the wisest tactical course for any firm wanting to gain a sound foothold in the Western economy. But, the time has now arrived when a thoughtful approach to cost reduction becomes an equally important part of foresight. The firm destined for continuing success in the West's increasingly competitive market must soon achieve economies in every operation that appears on the accounting books as an item of manufacturing cost.

As it happens, Western plants have special problems in approaches to cost reduction. In the new, almost-new, and recently expanded plants that predominantly characterize the new industrial West, first-generation plant management is unseasoned and labor skills are relatively untutored. In addition, channels for the interchanging of plant operating know-how—through manufacturer representatives, industrial distributors, trade shows, and technical societies—are not yet adequate for the region's needs. Westerners face painful difficulties, for example, in determining what equipment is easily available and the quality and quantity of sales engineering help to expect, in addition to facing the many plant operating conditions peculiar to the West.

During past years, WESTERN INDUSTRY has devoted its columns to material discussing ways to meet these special problems. Now, during 1956, a timely and appropriate goal of WI's service will be to help Western plant operating executives achieve significant manufacturing economies.

The issue you hold represents, we believe, a noteworthy contribution toward this goal. Presented in its pages are more than 50 selected case histories of actual cost reduction techniques already applied in Western plants, providing a storehouse of ideas that you can confidently appraise for applicability to your own needs, simply because you can be sure that the products involved are readily available to you and have already proved their worth under Western conditions.

The editors of WI wish you every success in your efforts to achieve important cost reductions in your plant during 1956.

PRODUCTION TOOLS and EQUIPMENT

26 selected examples of how manufacturers in the West are using modern equipment to do production jobs faster, better, and at less cost

SECTION 1 — WESTERN INDUSTRY'S 1956 COST REDUCTION IDEA-BOOK

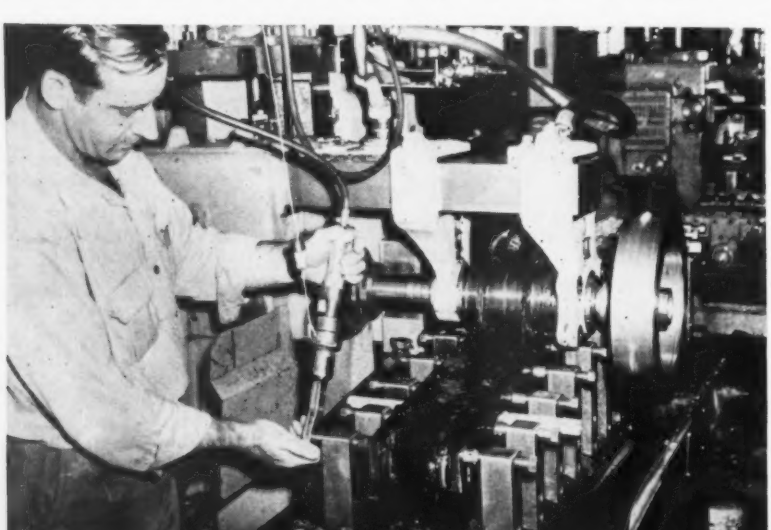
Air wrench makes light work of tightening hard-to-reach nuts

case history 1

Tightening 30 nuts on a fixture in hard-to-reach areas is being accomplished by using an air - powered ratchet wrench in a Los Angeles plant making chain saws.

After placing the fixture in position beneath the cutter of the milling machine, little room is left to tighten the nuts on bolts holding the work in the fixture. To tighten and loosen the 30 nuts by hand would require a lot of time and energy from the operator. Being portable and small in thickness, this ratchet wrench with a hex socket provides easy access to the nuts in hard-to-reach areas as well as all but eliminating operator fatigue from tightening the 30 nuts. The nuts are loosened by merely turning the wrench over. Thus, the ratchet wrench, a Keller Tool RSDRW model, both eliminates hindrances and increases production.

The tool is 15 in. long and weighs 5 lb. It is fitted with a straight wrench attachment to the air motor, but an attachment with a 20-deg. angle can adapt it quickly for other jobs :



Hard to reach while work is in this milling machine, 30 nuts on bolts holding work in its fixture are tightened with ease with air-powered ratchet wrench.

Arcee Foundry, South Gate, Calif., grinds aluminum castings faster and 50% less costly after changing to coated abrasive belts.

Abrasive belt snags aluminum castings at 50% less cost

case history 2

A better finish—at 50% less cost than was possible by the previous method—is being obtained by Arcee Foundry, Inc., South Gate, Calif., by snagging aluminum castings with coated abrasive belts.

The castings are parts for dental X-ray machines. The parts are ground on a floor backstand, on which is mounted a 2-in. wide rubber contact

wheel. The abrasive belt is coated with aluminum oxide mineral, and runs at 6,500 surface feet per minute.

With the previous method, operators were subjected to jarring and subsequent tension each time a work piece was brought into contact with the grinding wheel. With the smooth-running abrasive belts and contact wheel—which retains its original balance and does not change size—there is no jarring, tension is negligible, and operators do not tire as readily.

Production per man runs about 30 pieces per hour, with each belt lasting for about 150 pieces, or roughly 5 hr. The belts are a product of Minnesota Mining and Mfg. Co.

The switch to belts has not only increased production because belts grind faster than the previous method, but a substantial amount of down-time is saved. Where it previously took up to 15 min. to dress the wheel, abrasive belts are changed in a fraction of that time. This means that in an 8-hr. shift, less than 5 min. is lost in changeover down-time.

42-in. brushes beat corrosion to clean up tin strip

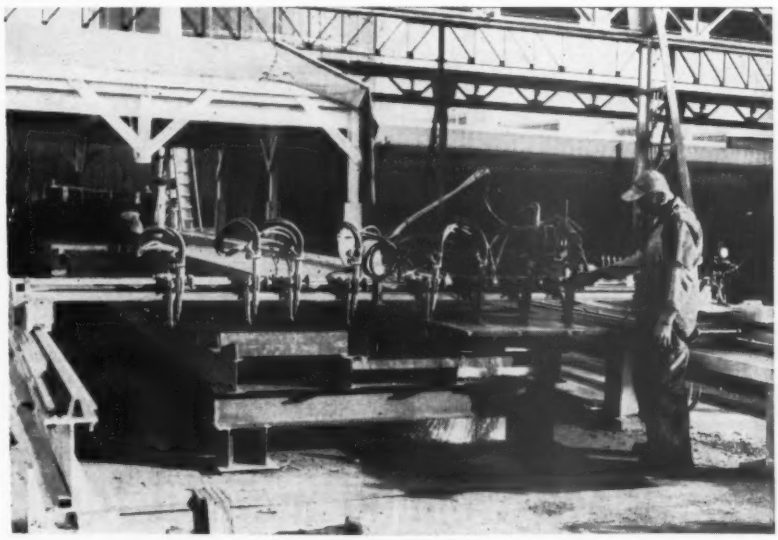
case history 3

A continuing search is made for materials and equipment that will yield optimum quality, increased service life, and lower operating costs in the production of tin plate. The focal point of one such search has been the brushes used for cleaning cold reduced strip prior to annealing. These brushes must be long wearing, have a continuous scrub surface, and require a minimum of time for replacement. The brushes and holder assembly must be corrosion resistant to the hot alkaline solution used in cleaning the cold reduced strip.

Being used for this application at Columbia-Geneva Steel Div. of United States Steel Corp., in Pittsburg, Calif., are brushes composed of continuous steel-backed brush strip spirally wound around and welded to a steel core and offering a uniform mass of material throughout its lateral surface. The brush is a one-piece unit, thus requiring minimum replacement time. Inventories are conveniently maintained because the brushes do not deteriorate in storage. Trade-named "Fullergript," the brushes are manufactured by the Industrial Brush Div. of Fuller Brush Co.

The brushes are 42 in. long, of 12 in. diameter, and revolve at 900 rpm. Five brushes are used to scrub the steel strip top and bottom at 1,800 fpm. strip speed. After cleaning and annealing, the strip steel is temper rolled, plated with tin, and made ready for processing into tin cans for the preservation and storage of food and many other products.

The same brushes can also be used to clean non-ferrous alloys.



Built by its user, Moore Dry Dock Co., Oakland, Calif., this flame-planer trues work up automatically and makes 10 cuts with beveled edges in one sweep.

Ten true cuts in 70-ft. steel with one sweep of flame-planer

case history 4

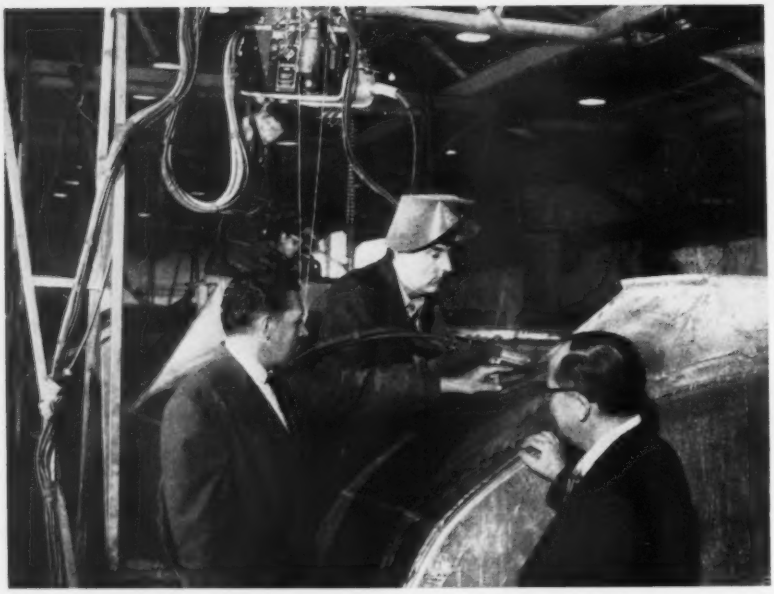
Cutting structural steel in preparation for fabrication of steel sections at Moore Dry Dock Co., Oakland, Calif., was a job which formerly required a great deal of time in skilled layout of the work to be done. Work had to be set up so that all cuts would be true and all dimensions correct. Building a flame-planer, which automatically trues the work up and can make 10 cuts with one sweep of the carriage, has speeded up production for this firm by as much as nine times.

Built to specifications provided by Linde Air Products Co., the flame-planer consists of a stationary bed, upon which the steel is placed, and an on-track carriage which is mounted with 10 Linde Oxweld C-58 cutting torches. Drive for the carriage is a fractional horsepower Oxweld motor which operates the carriage at a speed of 60 in. per min.

Two of the 10 cutting torches are mounted on a smaller carriage which rides a track on the main carriage and is driven by another Oxweld motor. They are used as cut-off torches as well as stripping torches. The main carriage is mounted perpendicular to its tracks to within a tolerance of .005 in. Therefore, when the cut-off carriage is run the length of the main carriage, cutting an even edge on the end of the steel plate, any cuts made on the steel are automatically perpendicular to the cut-off edge.

The flame-planer will handle a steel sheet up to 4 in. thick, 70 ft. long, and 10 ft. wide. Edges can be beveled through use of Oxweld angle-adjustable cutting tips. These are mounted to follow the cutting torch at a predetermined angle. Thus, the cut and the bevel are made with one sweep of the main carriage.

Linde pressure regulators are arranged to control the high pressure oxygen to all torches by one lever which is connected to each valve by a tie rod. Low pressure oxygen and acetylene are controlled by individual valves for each torch. Flame adjustment is made at each tip.



Simultaneous welding of front and rear sub frames on Fruehauf's new aluminum tank is done with a new inert gas consumable electrode process by welder Paul Anderson. Observing the operation are E. J. Campbell and Otto Bammer, both of Fruehauf's Los Angeles plant.

High-speed welding method for sturdy aluminum tank trailers

case history 5

The third major successful development in aluminum tank design and manufacturing progress for Fruehauf Trailer Co. is the new 900 series aluminum tanks. This new unit is made from a new high strength aluminum alloy 5086 in thicknesses from .090 to .750 in., and the unit is entirely fabricated by recent significant welding advancement, Aircomatic—patented and marketed by the Air Reduction Co. It is an inert gas consumable electrode welding process.

The Aircomatic process is a high speed welding method with resultant welding conditions of deep penetration, rapid metal deposition, and minimized distortion. By using an envelope of inert gas shield it excludes the possibility of atmospheric contamination, eliminates slag removal, and eliminates cleaning and chipping by the operator. With its shop at Los Angeles completely equipped with this modern welding equipment, Fruehauf can economically include many features in the 900 series which would otherwise be eliminated because of assembly problems.

By using new high strength allovs, lighter gages are permitted, but joining and design methods were revised and perfected. The lighter sheets also require that sheet stability be a more important design consideration than ultimate strength. With stipulations of this type Fruehauf incorporates its exclusive "hydraulic" bottom. This new innovation, when fabricated by Aircomatic, calls for highly contoured bottom shell panels for additional sheet stability. It is simply a matter of a highly contoured sheet being more sturdy than a comparatively flat one.

When stating a gross weight of 1,825 lb. for a 4,300-gal. truck tank, and 6,250 lb. as the weight for a complete 5,100-gal. trailer truck, one must visualize the "special" treatment which Fruehauf engineers provide the bottom shells. A minimum of work is applied this section, and then only that of the highest quality is accepted. This feature again accepts the Aircomatic as the fabricating technique.

All mountings are of the transverse or bolster type which tend to eliminate bottom shell flexure. Simple tension loads in the bottom actually improve the structure and make it more stable. The shell flexing over a mounting sill under a reverse load condition is eliminated.

The improved life expectancy of trouble-free service is improved by locating all joints in comparatively low stressed areas, and providing fabricating procedures and techniques proportionate to the other design features incorporated.

Fruehauf Trailer, which has been turning out trailers in Los Angeles to meet the particular needs and requirements of the Western trucking industry since the 1930's, now has 11 fully equipped factories and 83 sales and service outlets throughout the United States and Canada.

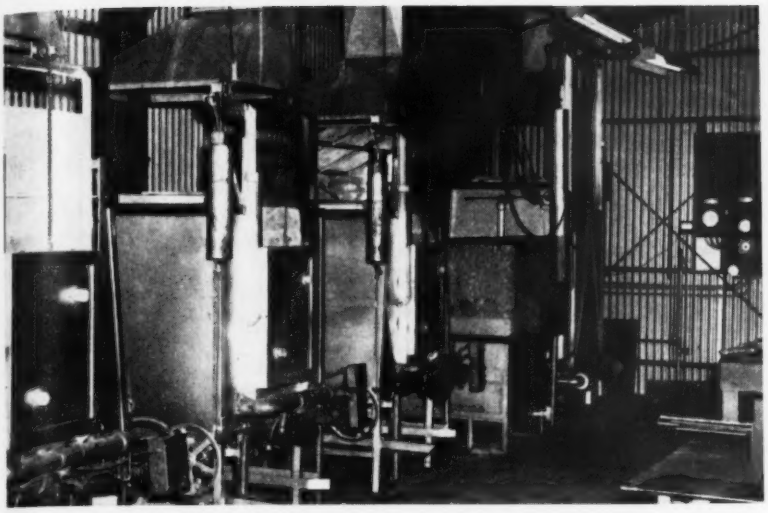
Tool production costs down 25% with own heat treat department

case history 6

When Zephyr Mfg. Co., Inglewood, Calif., recently pioneered a cold-forming method for the manufacture of power insert screwdriver bits, most suitable material selected as a shock-resistant, high-alloy tool steel of extreme toughness. Problem was to develop optimum physical properties for the bits on a high production basis. It was essential that a narrow hardening temperature range be held and, because of the high alloy content, that the hardening take place in a carefully controlled atmosphere to prevent even a minimum of decarburization.

Sample lots of insert bits were hardened in several commercial heat treat shops but even when the desired hardness was obtained, toughness and ability to drive screws were lacking and results were not reproducible. Then Zephyr installed its own heat treating department and equipped it with furnaces made by A. D. Alpine, Inc., of Culver City, Calif. These furnaces have now hardened more than one and a half million bits to a standard of uniformity.

The net results of Zephyr's installing its own Alpine-equipped heat treat department can be briefly summarized as follows: a net saving of more than 25% in heat treat costs; all operations now come under Zephyr's strict quality control and scheduling departments; and the flexibility of the Alpine equipment makes it possible for Zephyr to do all its heat treating in this



Setting up its own heat treating department for the processing of power insert screw driver bits has provided Zephyr Mfg. Co. of Inglewood, Calif., a savings of 25% over cost of commercial heat treating and permitted in-plant quality control.

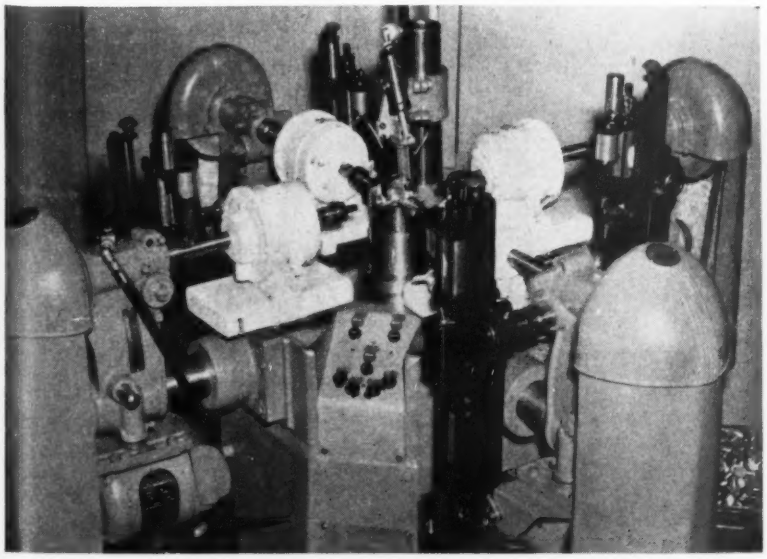
department, including high speed tool steel and its own tool and die work—annealing, normalizing, stress relieving, hardening, tempering, and case hardening.

Initial cost of the heat treat installation was about one-fourth the quoted figure for competitive salt bath or generated atmosphere equipment of similar capacity.

Air-powered drills gang up to tap holes at 200% faster rate

case history 7

A problem at C. A. Norgren Co., Denver, was how to reduce costs and speed production in tapping holes in die-cast bodies of the firm's oil fog lubricators and air pressure regulators. To do the job, Norgren designed a special machine consisting of four Delta 14-in. drill press heads for simultaneous tapping of four holes at once—two end holes plus top and bottom holes in the body of the lubricator unit; or two port holes and two gage holes in the body of the regulator unit. Drill heads have controlled-air power feed with hydraulic check for positive control and smoothness. Work is air-clamped in position. Chips are removed automatically by air blast.



Utilizing four 14-in. drill press heads, this special machine taps four holes at once in die-cast bodies of lubricators and regulators produced by C. A. Norgren Co., Denver.

Holes are now tapped four at once in less time than formerly required to tap one—300 operations per hour, total of 1,200 tapped holes, for an increase of more than 200% over former method. Taps are of better quality and more consistent than by hand tapping.

Details of the machine are as follows: Four Delta 14-in. drill press heads are mounted on the main casting, which rests on a base made of ¼-in. steel plate. Drill heads have No. 2 Morse Taper spindles powered by ¾-hp. motors. Four Procunier tapping heads No. 3E are mounted on support blocks riding on needle bearing cam followers which support and guide the heads. Each drill head is controlled by Bellows Controlled-Air power feed (Model DFE-360) equipped with Bellows Hydro-Check for positive control and smooth operation. A Mead air cylinder on top clamps work in position. After tapping, chips are automatically removed by air blast controlled by a Norgren blow valve. All devices are wired into the central control panel for safety and positive control. Power feeds will not operate until the clamp is secured, holding work in place and in proper relation to tapping heads, and motors running. The operator places work in position, presses button, and removes work after taps have returned to normal position.

Automatic spraying triples production of lighting units

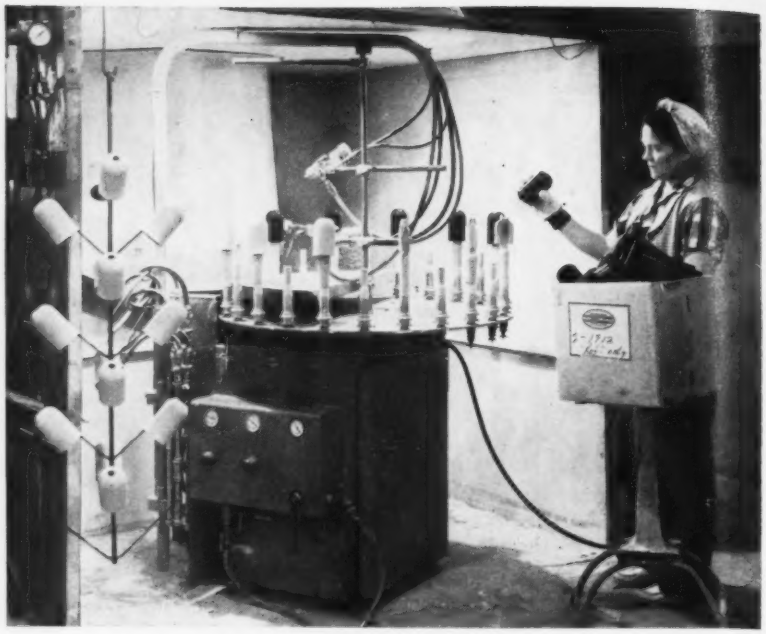
case history 8

Replacing a hand spray operation with an automatic spray machine has upped daily production of lighting fixtures from 900 to 2,700 for Smoot-Holman Co., Inglewood, Calif. Smoot-Holman is a prominent manufacturer of commercial and industrial lighting equipment and porcelain enameled steel plumbing fixtures.

Before spraying the parts automatically, the firm was able to coat only 40 lamp socket covers for each gallon of enamel used. Now they finish 160 pieces per gallon. Company officials state that compared with the old hand

spray method the new DeVilbiss machine saves them $160 every day.

Finishing is done automatically as the uncoated work passes in front of the spray guns. A trip mechanism automatically opens and closes the spray guns so that they operate only when work to be sprayed is in front of them. While traveling past the guns the workholders revolve rapidly so that all sides of the article are given a smooth, uniform coating.



A spray booth houses this turntable to confine spray and exhaust overspray.

Automatic finishing at Smoot-Holman provides effective control over film thickness, luster, color, and the amount of material used. The production rate is constant without the variances common to manual operations.

The rotary turntable-type machine is housed in a spray booth which confines the spray operation and exhausts overspray from the work area.

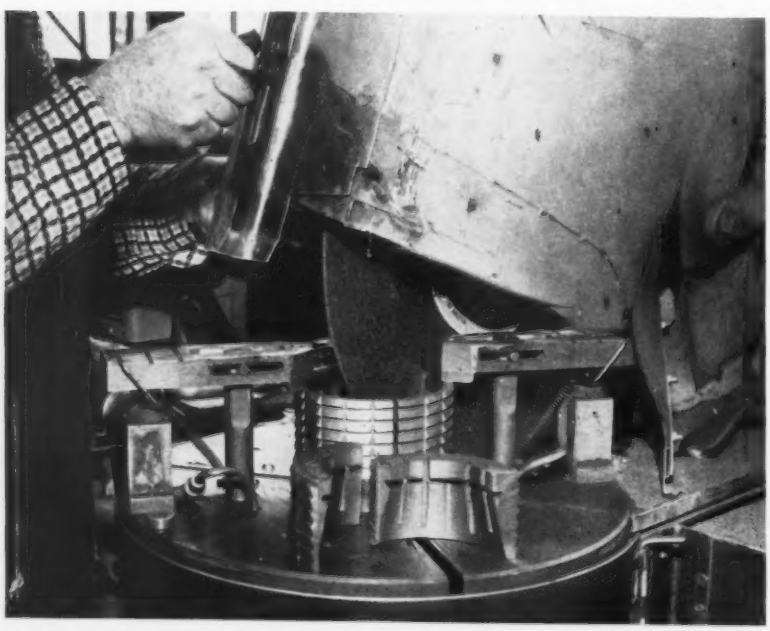
Cut-off wheel loss only 3/16 in. at 759 tough cuts

case history 9

A new cut-off wheel recently introduced to the metal trade has been showing excellent results in trials now being conducted in the West. Baker Oil Tools, Inc., Los Angeles, pursuing its policy of trying new products which show merit in reducing costs and increasing production, is currently conducting extensive tests with the B7 Bond wheel, made by Carborundum. Although the tests are not completed as yet, the results are favorable, and indicate that this 18x1/8x1-in. A30-T-B7 (grade) wheel will be a great factor in increasing Baker's production, while at the same time lowering wheel cost.

As one of the largest independent oil well tool equipment firms in business today, and as pioneers in cement work in oil well casings, Baker Oil Tools has been interested in increasing production of cement retainer slips, which are made from the material Nitricast. At the same time, the firm has also been interested in reducing the cost of production.

Each of the Nitricast cement retainer slips requires three cuts, the average cut being 3 in. long and 3/4 in. thick. So far, the B7 Bond cut off wheel has cut 253 slips, making 759 cuts or 2,277 in. and the wheel shows only 3/16-in. wheel loss, according to Raymond Littlewood, bonded sales engineer for Carborundum's Los Angeles district.



Testing a new type cut-off wheel in its production of cement retainer slips has shown Baker Oil Tools, Inc., Los Angeles, how to increase production and lower wheel costs.

Automatic welders for fabricating 12-ft. containers

case history 10

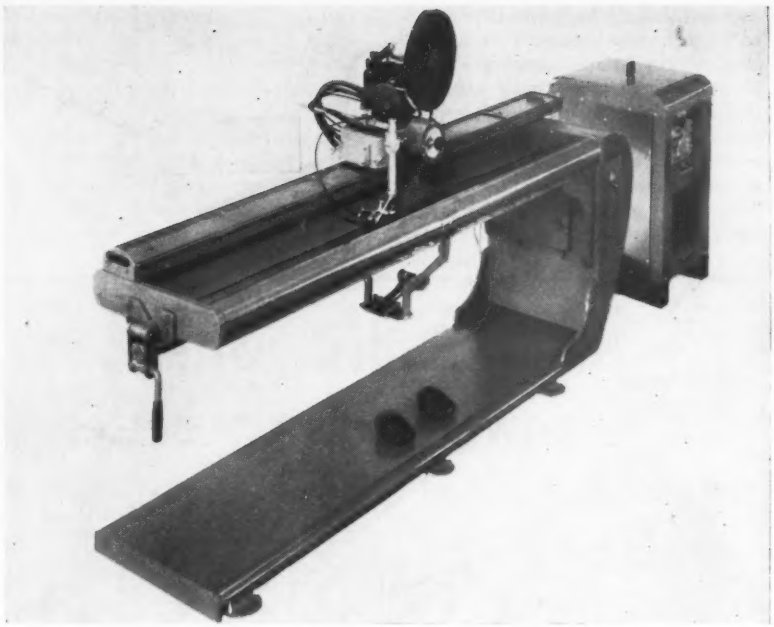
Airline Welding and Engineering, Hawthorne, Calif., designer and manufacturer of automatic welding equipment, recently received a call from a firm which had just been awarded a multi-million-dollar ordnance contract for the manufacture of metal containers. Produc-

tion schedule on the contract called for over 8,000 units per month.

Overall length of the containers to be fabricated was 12 ft. and the unit consisted of three sections—nose, center, and tail. Airline's task became the estimating of the number and types of machines required to do the job and the manufacture of the machines at a cost in keeping with the contract amount.

Finished design called for 12 Miller Model TA-252-AP welding transformers as power for each machine. Airline computed machine requirements to be six automatic circumferential welding fixtures and four automatic longitudinal welding fixtures. When manufactured, the machines were installed in the ordnance plant by Airline, complete with welding heads, controls, and power plant.

Wiring was done in the plant, machines leveled by transit to insure perfect working conditions, and Airline actually trained plant personnel in the particulars of operating the welders.



Over 8,000 metal containers per month are produced by ten welding fixtures like this.

Handling time down 50% in heat treating small parts

case history 11

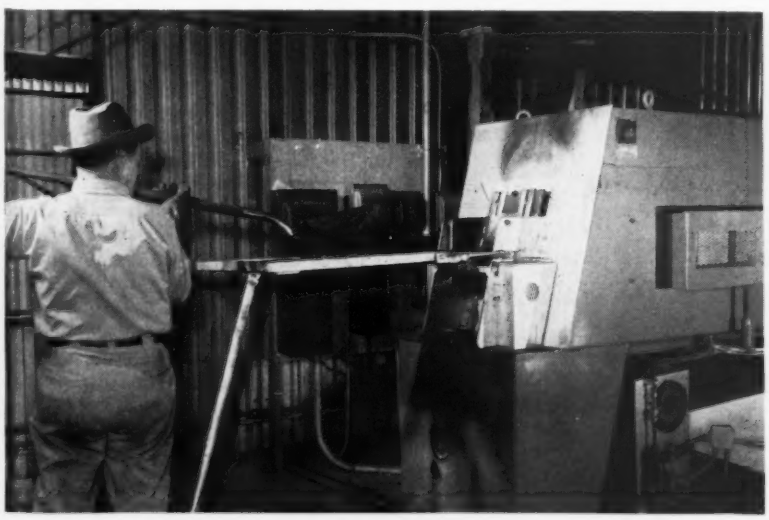
Downey Steel Treating Co., Downey, Calif., has reduced handling time by 50% and thus lowered handling cost in its heat treating operation while increasing the degree of quality of treated parts with the installation of a Pacific Shaker Hearth furnace.

Capable of handling up to 150 lb. of small parts per hour, the furnace receives parts on the hearth and they are then conveyed automatically through the entire cycle at a controlled rate. Without extra handling, the parts are heated, drawn, and blued to uniform hardness.

Accurate controls have eliminated brittleness. Designed for continuous production, the furnace performs bright hardening, carburizing, and dry cyaniding at temperatures as high as 1,750 deg. F. Any type atmosphere can be used without damage to the heating elements.

Distortion in work is prevented through use of an accurate two-zone temperature control system. Warpage from chilling effect of incoming cold parts is completely eliminated.

The furnace shell is constructed of heavy gage steel, reinforced with structural members, and welded into one unit. Two-part hinged construction provides easy access to retort and heating element. The furnace is insulated with lightweight fire brick and preformed slabs of low conductivity to assure efficiency in the heat chamber, less heat loss, and cool outer shell surface.



Once placed on the hearth of Downey Steel Treating's new furnace, 150 lb. of small parts per hour are automatically conveyed through heat treating cycle at controlled rate.

Investment casting halves the cost of warp-prone part

case history 12

The uniform properties of investment castings may often be used to overcome the inherent disadvantage of forgings wherein the physical properties are lower in the transverse direction than in the direction of work. This feature is dramatically illustrated in a part Northrop Aircraft

uses in the F-89 Scorpion. Production of a part, which started as a 4340 steel forging requiring overall machining, yielded a scrappage loss of more than 50% due to warpage caused by transverse cuts and by cracks occurring in heat treat. Added to the $2.00 initial cost of the forging, $13.21 was spent for machining, and the machine vendor lost money because of the amount of machine time spent on each part before defects developed.

Bone Engineering Corp. of Glendale, Calif., solved this problem. The firm proved that cast properties in a precision investment 4140 steel casting, heat treated under careful atmospheric control, produced a part which exceeded the mechanical properties of the machined forging, and reduced the total cost to $5.50 each. Since it was possible to cast a complete part, except for a .0005 tolerance ream operation, production met the customer's schedule and a high percentage rejection of parts was stopped.

Except for a .0005 tolerance ream operation, this part is entirely cast by investment method which has reduced scrappage.

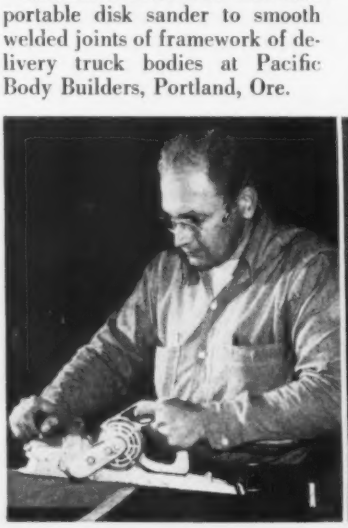
Details of this significant case history were provided by Edward G. MacLennan, sales manager of Bone Engineering Corp., who also points out that Bone is producing many parts that are so intricate that they could not be produced by any other method than investment casting, and that the design engineer also has at his disposal, hard to machine alloys such as cobalt and nickel base alloys, which are difficult to forge, but can be readily cast to size.

case histories 13-16

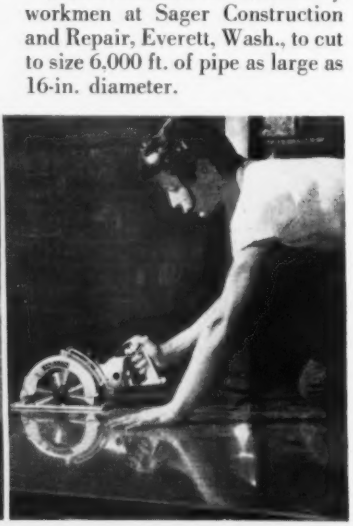
4 jobs that portable power tools do better

Mechanic Steve Bell uses Skil portable disk sander to smooth welded joints of framework of delivery truck bodies at Pacific Body Builders, Portland, Ore.

Model 825 Skil saw is used by workmen at Sager Construction and Repair, Everett, Wash., to cut to size 6,000 ft. of pipe as large as 16-in. diameter.



Jobs formerly done with hand tools have been speeded up by use of a Skil portable electric planer at Morris, Inc., of Everett, Wash. Here, William Nelson, shipwright foreman, smoothes and shapes decking supports of Bryant Pleasure Boats manufactured by Morris.



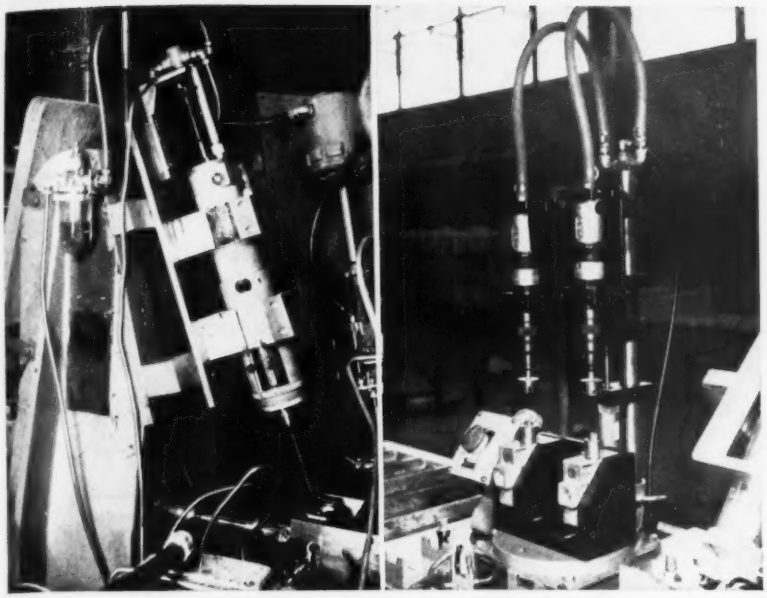
Tapered Air Products, Lynwood, Calif., uses Skil portable power saw to cut 500-lb., ¼-in. sheets of aluminum for jet plane wing sections. Portable unit permits cutting of the aluminum upon removal from delivery truck, thus reducing handling and stock problems.

Automatic drills and nutsetters on 8-sec. cycle

case history 17

Grayson Controls Div. of Robertshaw Fulton Controls Co. recently opened its new multi-million dollar plant for the manufacture of thermostatic heat controls in North Long Beach, Calif., with the new plant housing new and modern production facilities in considerably expanded factory area.

Because of the long life and trouble-free service Grayson had experienced in the use of Aro air tools in its previous plants in Lynwood, the firm chose to operate new Aro equipment on its high-volume production lines at the new plant. With the aid of Aro equipment, plus the ingenuity of its own engineering departments, Grayson has accomplished an automation



Hole produced by this automatic drill (left) must be burr-free to mate with another predrilled hole. Cam action on nutsetters (right) allows tools to pick up special nuts to be set even though the nuts are not at an even height when started.

program of its own, illustrated above.

On the left is the new Aro automatic drill producing a 5/32-in. I. D. canted hole in a thermostatic control casting. This hole is 1 5/16-in. deep and mates with another predrilled hole, so must be burr-free. The drill unit is started with a solenoid valve, drills the hole to the proper depth, and returns to the "start" position automatically to await the next cycling operation, which occurs every 8 sec.

Illustrated by the photo at right are two Aro nutsetters with friction clutches mounted on a single arm with a common axis. This gives the tools a cam action so they pick up properly the special nut to be set even though the nuts are not at an even height when initially started.

Chipped gear teeth restored by low heat welding process

case history 18

It is rarely the large spectacular breakages which cause down-time in industrial operations. It is usually the breakage of small parts, the displacement of small quantities of metal, or wear on a vital part.

The gear teeth in the metal-working machine illustrated, for example, had been broken when the machine was operating under heavy load. The few ounces of metal chipped away rendered the equipment useless until a repair could be effected, or a replacement obtained.

Cast iron is very susceptible to cracking. If the gear were heated beyond its critical temperature range cracks would almost inevitably result. Cast iron is also a poor conductor of heat. One section of a gear could be at a red heat, while another section would remain cold. This uneven expansion is a major cause of cracking.

The gear was examined to determine the extent of the damage. Teeth had been chipped in two places. It was decided to repair them with the Low Heat Input process using EutecRod 14 F.C., manufactured by Eutectic Welding Alloys Corp.

Teeth of this cast-iron gear were chipped and broken when it was operated under a sudden overload. At right: after repairs.

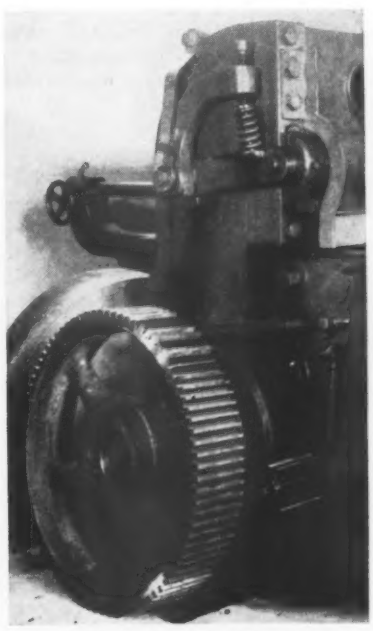
The sections were thoroughly cleaned and the defective and fatigued metal removed. This left a surface to which the alloy would bond readily. The chill was removed from the casting and Temperature Indicating Eutector flux 14 applied to the joint area. An oxyacetylene torch, adjusted to a neutral flame, was used to heat the metal in the vicinity of the joint. The flame was directed upon the adjacent metal so that the heat was conducted to the flux. When the flux melted it indicated the approximate bonding temperature of the parent metal and was the signal to apply the alloy.

The torch was held at a 30-deg. angle and a bead of alloy was applied. The flame was directed upon the bead until the force of the flame flowed it ahead. The tip of the rod was inserted into the molten puddle and another bead applied. This in turn was flowed ahead. The technique was continued until a complete pass had been made.

The next pass was made on top of the first until the tooth had been built up to the desired dimensions.

The torch flame was used to shape the deposits and to produce the approximate contour of the original tooth. This reduced subsequent finishing operations. Very little work was necessary to restore the build-up to the original dimensions.

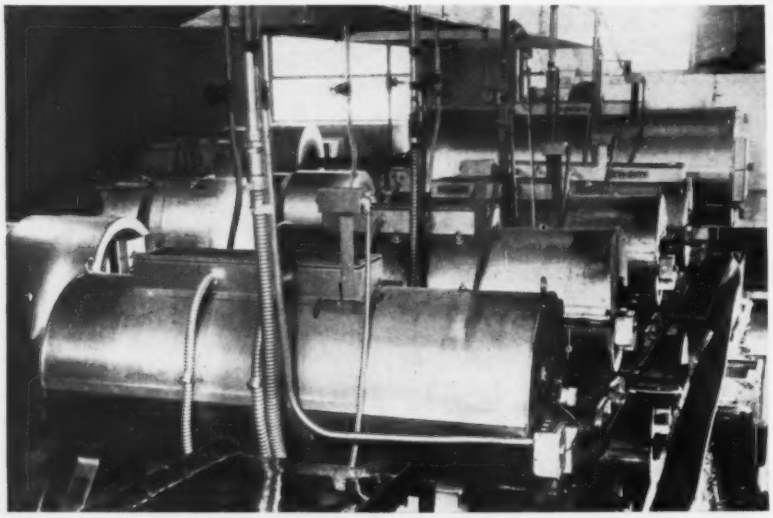
This technique was followed with



Repaired by the Low Heat Input process, the cast-iron gear is pictured here repaired and ready for assembly.

each defective or broken tooth. When the build-up had been completed the areas were packed in asbestos and permitted to cool slowly.

The secret of repairing cast iron with the Low Heat Input process is the use of a suitable low melting point alloy which possesses the properties required for end use. The carbon in the cast iron must be retained in the form of graphite. If it is permitted to remain as cementite or iron carbide the metal becomes hard and brittle. This is why joining temperatures should be kept to a minimum and parts permitted to cool slowly.



Designed specifically for bright hardening, bright carburizing, bright dry cyaniding, and similar heat treating operations, these furnaces will provide temperatures up to 1,900 deg. F.

Heat treating cost down 50% for ton of saw teeth per day

case history 19

Oregon Saw Chain Corp., Portland, Ore., has increased its production of heat treated saw teeth through installation of five Hevi Duty Electric shaker hearth furnaces. Although they provide an increase in production, the new furnaces have reduced the cost of the operation by one half. Therefore, at a production rate of over a ton of small parts per 8-hr. shift, cost of the equipment was offset over a short period of production time.

Costs were further reduced by a decrease in floor space required per ton of production, elimination of salt disposal problems, minimized handling, and inspection of parts. Maintenance costs were also reduced.

Passing through the furnace in a natural gas atmosphere, parts fall directly into a quench. Quench tank is equipped with two perforated steel receiving baskets. This provides continuous operation, one basket unloading while the other receives material from the furnace. Operation of the furnaces is automatic and requires only one man.

The furnaces are specifically designed for bright hardening, bright carburizing, bright dry cyaniding, and similar heat treating operations which require temperatures as high as 1,900 deg. F.

Reaming cost down to 0.0001 cent per hole

case history 20

Aerojet-General Corp., Los Angeles, has reduced the cost of reaming holes in a drilling-reaming operation to 0.0001 cent per hole through the use of Tomkins-Johnson reamers. Average number of holes finished per reamer totals 32,000.

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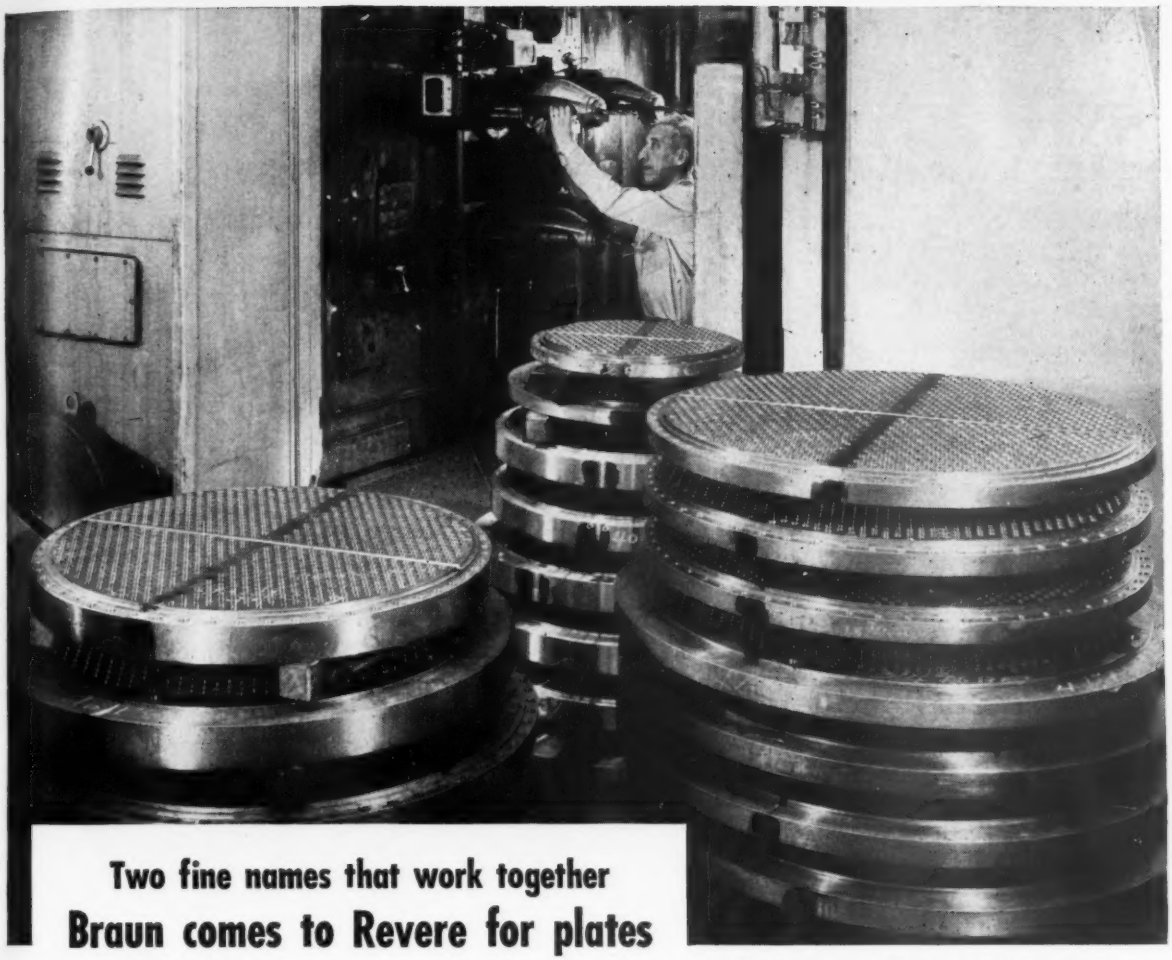

Tube sheets at 4-spindle automatic drill in Braun shop.

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C. F. Braun & Co., Alhambra, Calif. is well known in the petroleum industry, the chemical industry, and other businesses in which heat transfer and fractionation are vital. Revere Copper and Brass Incorporated is well known in the non-ferrous metal industry for its tube sheets and plates, in all the customary alloys. What is more natural than the close relations between the two companies, Revere the supplier, Braun the fabricator? Revere can furnish heavy plates when needed; Braun is one of the great heavy-duty shops of the country. So far as transportation limits permit, Braun fabricates in its own plant; their machines and their cranes can handle anything the railroads can haul away. The same is true of Revere, which is likewise known throughout heavy industry for its ability to produce not only large plates, but also condenser and heat exchanger tubes.

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A Braun engineer inspects a drilled tube sheet.

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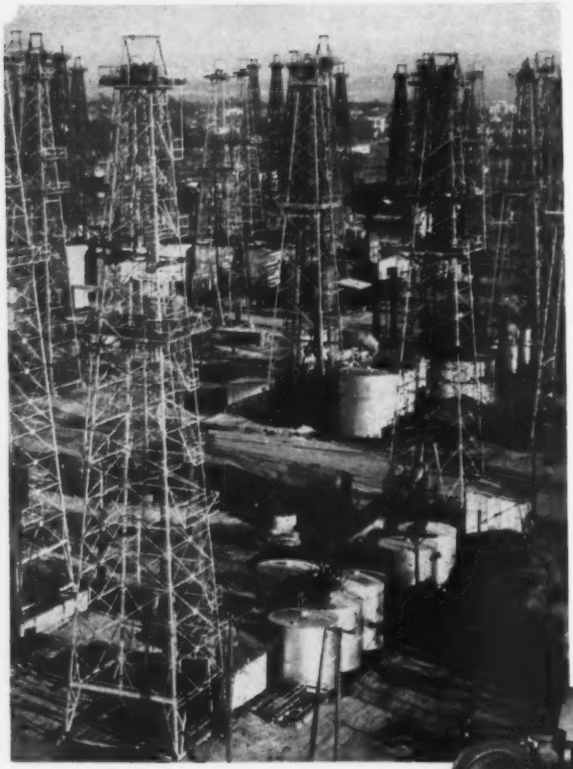

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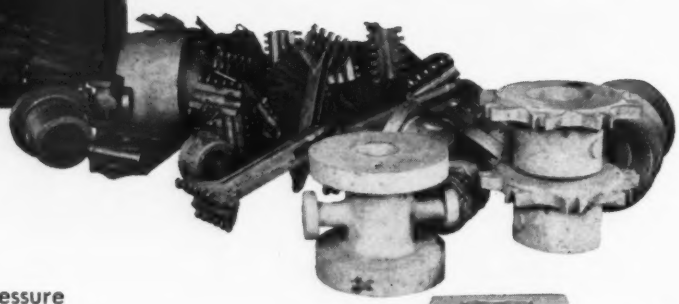

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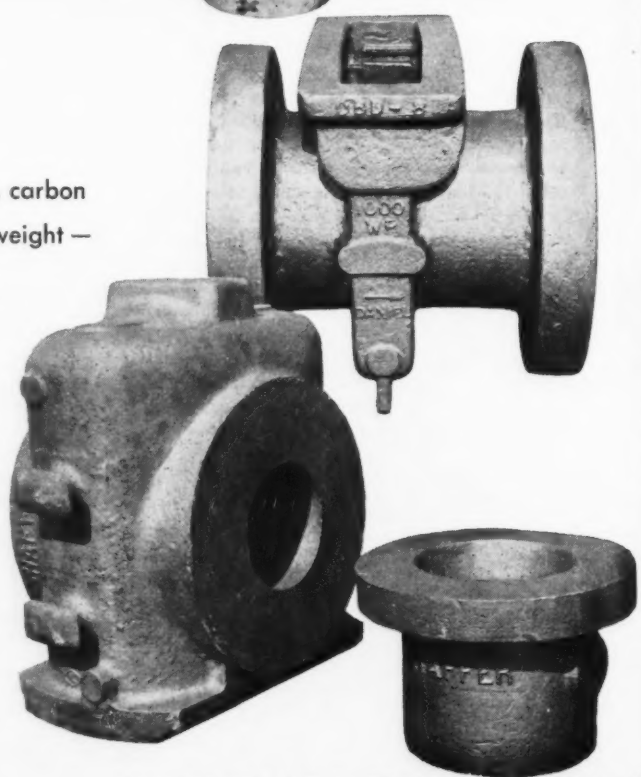

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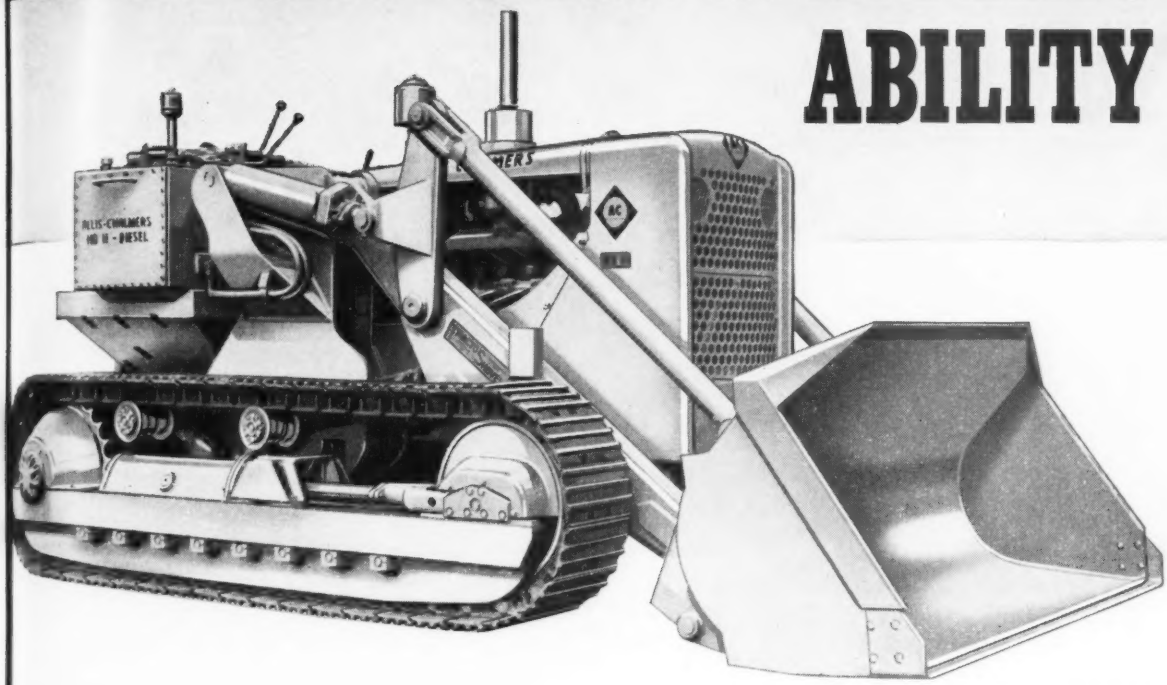

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32,000 lb
11-ft, 7-in. dump height

with the ALLIS-CHALMERS HD-11G TRACTOR SHOVEL

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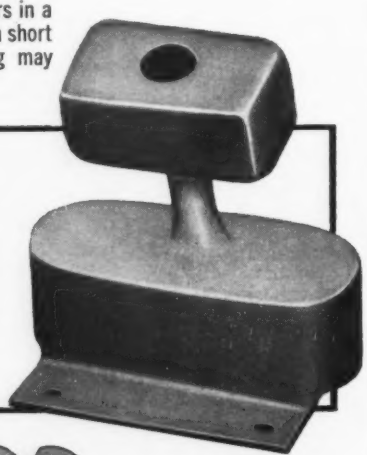

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As parts index from station to station, this machine finish-reams four holes in each of three parts within .003 tolerance.

reaming C-1213 bar stock on a W. F. & John Barnes drilling machine. Holes are held to .7904 within .003 tolerance. Feed rate is 4.9 in. per min. A multi-station set-up, the machine drills the holes, rough reams and finish counterbores them, and then finish reams four holes in each of three parts as they index from station to station.

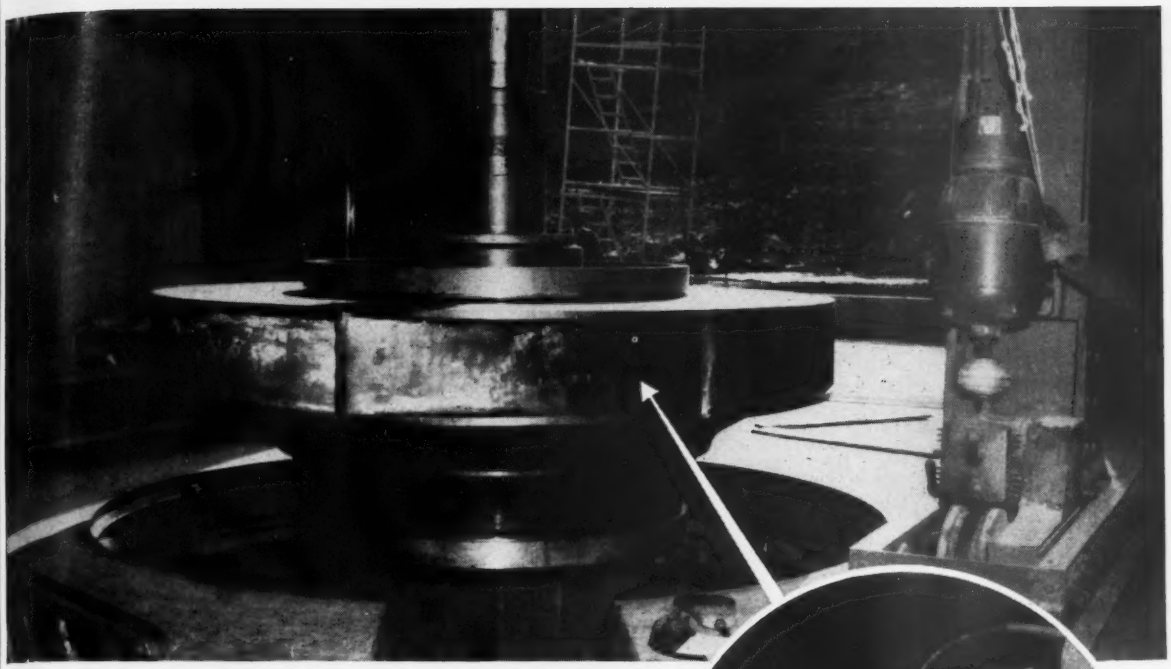
After delivery from the machine, the parts are passed over an air gage and the holes are checked simultaneously for correct diameter and true roundness. Hardened reamer shanks which provide good bearing support in the bushing can be used with Tomkins-Johnson reamers. Thus, liner life is longer, and accuracy in both size and hole location is consistent.

Redesigning for welding drops costs 20%

case history 21

Towner Mfg. Co., Santa Ana, Calif., builder of farm implements, has reduced costs and improved quality by redesigning for welded construction and using semi-automatic, submerged arc welding to fabricate the weldments.

Typical of what has been accomplished are the results achieved on a 3 1/8-in. O.D. spacer spool used to separate discs on a gang plow. Costs were reduced approximately 20% and breakage has been eliminated. The axle assembly has been given greater



Sigma welding has made the repair of these large pump impellers faster and more economical. Finished welds are a sound, homogeneous bond.

Sigma Welding Saves $5,000 per unit

Speeds repair of world's second largest pumps . . .

During operation, giant 20 ton manganese bronze pump impellers like this one, suffer cracks ranging in size from small sand inclusions, to cuts over a foot long. By using sigma welding, it is now possible to make high quality, on the spot repairs without disassembling the units — this results in an immediate savings of 5,000 dollars per pump.

Shown above is a typical repair operation on one of the 22,000 hp. electric motor driven pumps. This crack is 11-in. long, 2½-in. wide, and 2-in. deep. The four pegs adjacent to the crack are strain check points. Frequent measurements made of the distance between them determines welding duration and the peening sequence necessary to control distortion which in this operation was less than 0.005 inch. The completed weld made with aluminum bronze wire has an excellent surface appearance and color match.

You can speed production and cut costs in your operations—find out more about sigma welding from your local LINDE representative . . . Start saving now, call him today.

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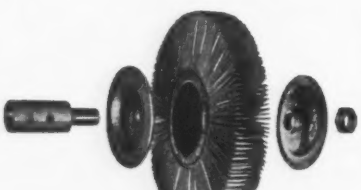

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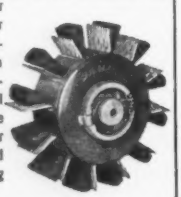

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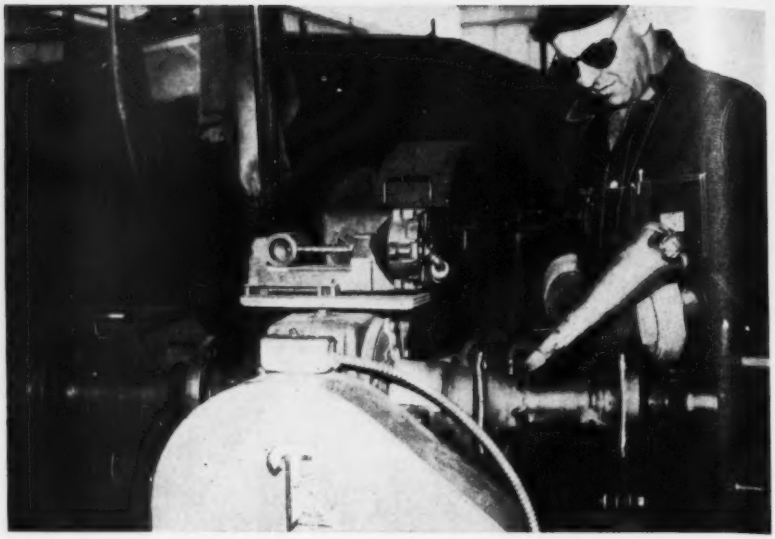


Weldments are performed on 3⅛-in. spacer spool used to separate discs on gang plows manufactured by Towner Mfg. Co., Santa Ana, Calif., by semi-automatic, submerged arc welding.

flexibility and weight reduced.

The previous cast iron design was subject to breakage when the plow would hit rocks or other hard objects. The steel design, which eliminated this problem, is fabricated in the fixture pictured above.

Using The Lincoln Electric Co.'s Manual Lincolnweld equipment, with the aid of a helper, one man turns out 250 pieces per day. Floor-to-floor time per spool is 59 sec. The fixture has a double welding station so that one station may be unloaded and loaded while the other rotates a spool under the welding gun held in the operator's hand. The welding speed is 30 in. per min.; the wire, 5/64-in. L-60; the flux, number 840.

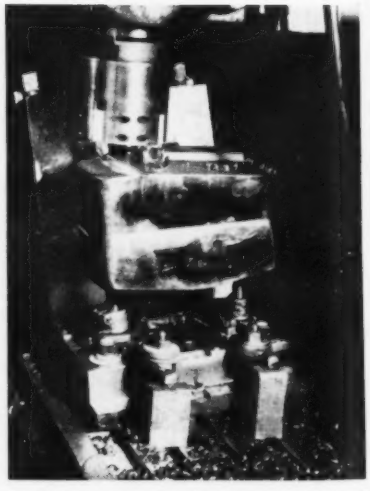
The device on top of the gear box is an air vise which has been adapted for automatically cutting off the slag on the tip of the electrode wire after each weld. The fixture is driven by a ½-hp. a-c motor with a belt-drive to a gear reduction box.

0.1-in. cuts in steel forgings —6 pieces milled per regrind

case history 22

Face milling rough SAE 4130 steel forgings at the H. W. Loud Machine Works, Pomona, Calif., as shown in the photo, requires over one inch of stock removal because this basic forging is used for both left- and right-hand parts. By using a 3-in. diameter step mill with four standard Kennametal Style 39M40 tipped blades, 0.400-in. depth of stock is removed per pass, with each blade taking a 0.100-in. cut. Three passes are made to mill the 7x10-in. face to the required dimensions. This operation is performed on a No. 3 Kearney and Trecker vertical mill at 365 rpm. and 4.5 ipm. feed.

Until recently, Kennametal Grade K2S, a well-known item in the general steel cutting field for years, was used



Stock is removed from forgings at H. W. Loud Machine Works, Pomona, Calif., at the rate of 0.400-in. per pass of four blades.

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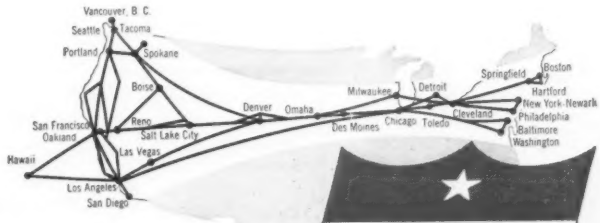

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on this job. With this grade, two and sometimes three pieces were milled per regrind. Now, with Kennametal's new general purpose steel cutting Grade K21, four to six pieces are milled per regrind. Grade K21 has exceptional high edge strength, combined resistance to edge wear and cratering, and high hardness with resistance to breakage. It is suitable for moderate or heavy roughing cuts on high tensile materials, and is recommended for plunge and interrupted cutting.

Cutting wire rope a cinch with resinoid wheels

case history 23

Abrasive cut-off wheels have solved a difficult wire rope cutting problem in a Northwest plant. Wire rope of all sizes is now cut quickly and easily without deforming or unraveling individual wires with a Norton reinforced resinoid wheel.

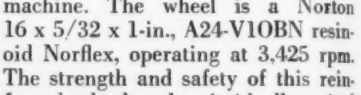
A 16 x 5/32 x 1-in. resinoid cut-off wheel cuts wire rope without deforming or unraveling wires in a Northwest plant.

Pictured is a piece of wire rope being cut on a 10-hp. DeWalt cut-off machine. The wheel is a Norton 16 x 5/32 x 1-in., A24-V10BN resinoid Norflex, operating at 3,425 rpm. The strength and safety of this reinforced wheel makes it ideally suited for this rather unusual application.

Hose clamps pal with mallets to save $2,246

case history 24

An unusual use for hose clamps is reported by a water pipe manufacturing plant, where hickory mallets are used to knock sand cores out of bell and spigot hub castings. The firm found that these mallets were being used up at a rate of twelve a day. The



mallets were made in the plant's pattern shop at a cost of 82c each, and therefore were costing the company $9.84 a day.

The company was using Punch-Lok clamps for general shop hose maintenance, and just by chance someone suggested that they reinforce the mallet heads with these clamps. It worked! Although the cost of each mallet was increased $1.20, the number of mallets used up was reduced to one a day.

Annual savings for the firm from this one cost reduction idea is currently $2,246.

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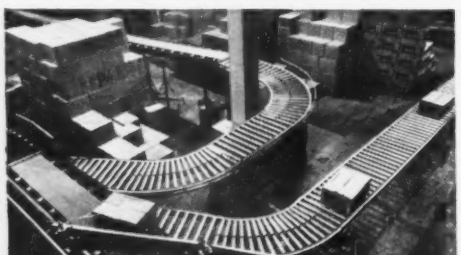

Order-picking is expedited and simplified by this Standard system of roller and belt conveyors in large warehouse.

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Formable core material nests easily into compound curved mold on this bonded aluminum-fiberglas pod built for Convair in San Diego.

Formable sandwich core material cuts lay-up time 65%

case history 25

Use of a highly-formable sandwich core material has saved an estimated 65% in lay-up time on an outsize "flyaway pod" (an aluminum and fiberglas component produced by Narmco Manufacturing Co., San Diego, Calif., for Convair division of General Dynamics Corp.)

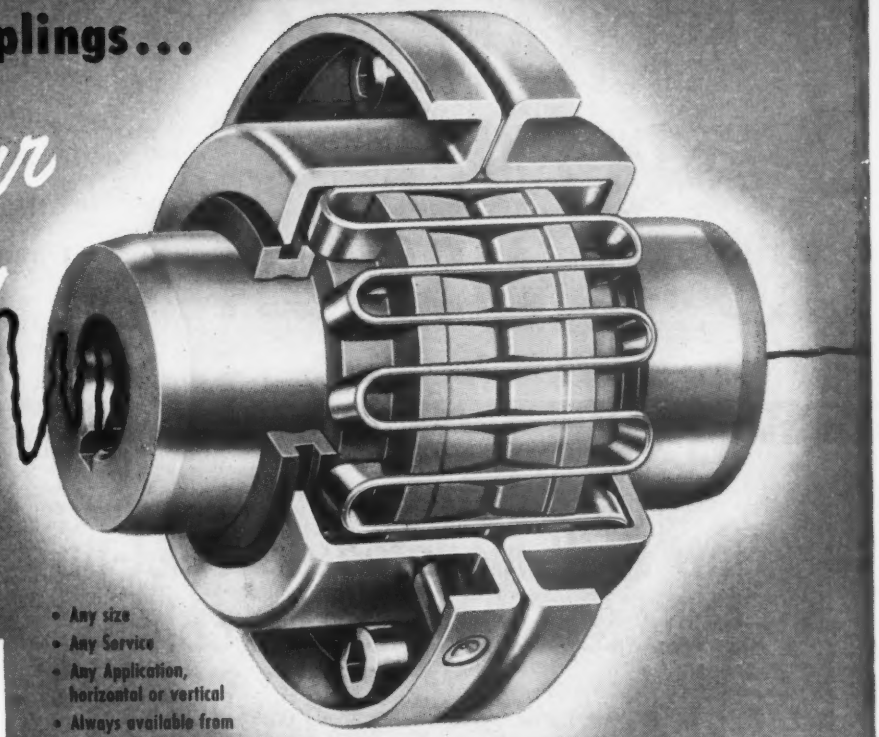
Twenty feet long and up to 5 ft. in diameter, the big pod is fabricated in sections using aluminum foil core, which nests easily into compound contoured sections without preliminary shaping.

Sandwich construction is used in the pod structures to obtain lightweight, contoured sections with a minimum of production and tooling expense. The Convair pods are fabricated of "Multiwave" bonded to Conolon phenolic-impregnated fiberglas faces.

The "Multiwave" sandwich core, recently developed for continuous automatic production in a variety of metals and non-metals by Narmco Metlbond Co., permits formation of extreme compound curvatures without saddling, crippling, or the need for precurving or slicing. Narmco engineers estimate that in many cases the new core has saved upwards of two-thirds in lay-up time over conventional honeycomb core.

Falk Steelflex Couplings...

Protect your machinery in 2 ways



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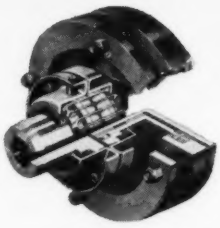
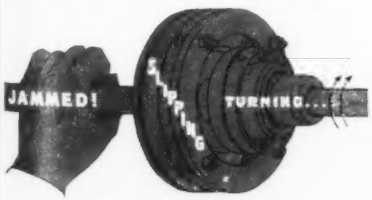


Falk Controlled Torque Couplings prevent damage from overloads

In applications where danger from overloads exists, use the FALK Type FT Controlled Torque Coupling. The Type FT has all the features and advantages of standard FALK Steelflex couplings—and, in addition, has an adjustable friction slip clutch, enabling the operator to set the coupling to slip at any predetermined overload.

This controlled-torque principle not only prevents transmission of dangerous shocks and limits overloads; it eliminates the breaking of shafts caused by jamming of driven equipment.

An outstanding advantage of the Type FT Coupling is that, as soon as the cause of the overload is removed, the entire coupling will rotate and transmit power without replacing parts or repairing coupling.



There's real economy in using Type FT Controlled Torque Couplings. Many users have reported that these couplings paid for themselves the very first time they slipped (under overload) because of the protection against damaged driving or driven machinery!

...cost less per year of service!

You get *double protection* when you connect your driving and driven machinery with a Falk Steelflex Coupling—the all-steel coupling with the exclusive grid-groove design! First, its *torsional resilience* smothers shock and vibration; and second, the Steelflex design prevents damage and lowered efficiency by accommodating shaft misalignment.

Why have increasing numbers of key men in industry standardized on Falk Steelflex Couplings? Their experience has proved that Falk Steelflex Couplings prolong the service life of their machinery... are trouble-free and need minimum maintenance ... are easy to install, lubricate and disconnect ... and *cost less per year of service* than ordinary couplings.

One basic Steelflex design—the type F, in its many sizes—is adaptable to more than 90% of all industrial applications. For applications involving danger from overloads, Modified Type FT Controlled Torque couplings (see column at left) are ideally suited. There are numerous other special or dual purpose Steelflex couplings for unusual applications. **Write to Department 247** for engineering bulletin, including selection and dimension tables.

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MECHANICAL POWER TRANSMISSION

14 selected examples of how manufacturers in the West are using modern equipment for drives and power control, with reductions in operating cost

New shaft-mounted drive set-up solves tension control problem

case history 26

Maintaining tension on material while it is being processed—such as is necessary while soaping and rinsing textiles or in the manufacture of paper products, etc.— can be a difficult task. Engineers at the Portland Woolen Mills, Portland, Ore., solved such a problem recently in the following manner.

Passing over a series of driven rollers, the fabric being manufactured dips in and out of several solutions during the soaping and rinsing process. As the material stretches and shrinks, it is necessary to compensate tension maintained by the rollers accordingly.

The shaft mounted drive, a Falk speed reducer unit, is designed so that the output or slow speed shaft is hollow and can be mounted on the driven shaft. The input shaft of the drive is connected to a tie rod which can be adjusted to resist torque and to vary belt tension of the driven shaft. Such adjustment is usually made by turning a turnbuckle in the tie rod.

Engineers at the woolen mill substituted a simple, but effective, weight-balanced linkage mechanism for the turnbuckle tie rod. Thus, as the fabric stretches or shrinks, the position of the top roller moves and varies the centers in the variable speed pulley drive between the gearmotor and the high speed shaft of the shaft mounted drive. Automatic tension control is maintained on the fabric during the soaping process.

Shaft mounted drive at left in the photo is driven by a 2-hp., 230-rpm, output gearmotor, through standard V-belt sheaves. The drive at the right is driven by an identical gearmotor, but through a Lewellen variable speed pulley.

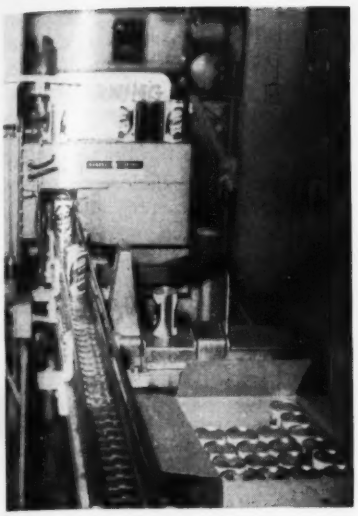
Lever linkage, counter-weights, and variable pitch sheaves combine to control the tension on fabrics passing through this soaping operation at Portland Woolen Mills, Portland, Ore.

New chain reduces can hang-ups and line down-time

case history 27

Cost reduction in the combined form of less damage to cans and bottles, less down-time due to hang-ups on conveyor lines, and a cleaner operation have been realized by Regal Pale Brewery in San Francisco due to a change to Rex Table Top chain on its can and bottle conveyor lines. However, another Chain Belt product, Rex Nylon Table Top chain, has proven successful during a trial period and will soon be replacing a large portion of the chain now in use.

Original chain used to convey cans and bottles through the filling, capping, pasteurizing, and packaging



Regal Pale Brewery in San Francisco, Calif., uses over 3,500 ft. of Rex Table Top chain on its can and bottle lines.

operation often caused hang-ups due to a wide gap between links. At the point of transfer from one line to another, the chain followed around a drive sprocket and the can or bottle was carried onto a wear or transfer plate.

If mounted close enough to the chain to make a smooth transfer of can or bottle from chain to plate, the large gap between chain links often caused the chain to catch on the wear plate and hang up. This caused damage to the chain and lost production time. If, as was the case, the wear plate was mounted far enough from the chain to prevent such a hang up, bottles and cans tended to follow the chain around the sprocket, its bottom edge catching on the wear plate and either tipping the can or bottle over or actually cutting the cans and breaking bottles.

Drive sprockets on the original chain made contact with each link in pockets in the undersurface of the chain. Sprocket was narrow and did not provide adequate lateral support. Also, the pockets provided a constant dirt problem and caused higher maintenance costs.

The brewery is now using about 3,500 ft. of Rex Table Top chain which has eliminated all of these problems due to its design. Interlocking portions of the chain links provide hinge connection and gap between links is minimized. Also, the interlocking portion of the links provides a wide no-gap area even when the chain is passing around its drive sprocket. Therefore, wear plates can be mounted close enough to the chain to provide smooth transfer of cans and bottles.

Drive sprockets, rather than reaching into pockets for contact, wrap around the chain's hinge as a means of drive contact. A wide area of contact has been provided to increase the life of the sprocket and to give better lateral support to the chain.

Recent appearance of Rex Nylon Table Top chain on the market gave Regal Pale an opportunity to make a further attempt at cost reduction on conveying lines. A trial quantity of 50 ft. was purchased and put to use on a few lines which handled cans after the pasteurizing operations. It was found that the cans do not wear the nylon as they have the steel and that they handle more smoothly. Furthermore, the horsepower required to drive the nylon chain is reduced due to the reduction in weight. Plans call for immediate replacement of steel chain with nylon chain on all can lines which follow the pasteurizing operation. Bottles do not handle as well on the nylon chain.

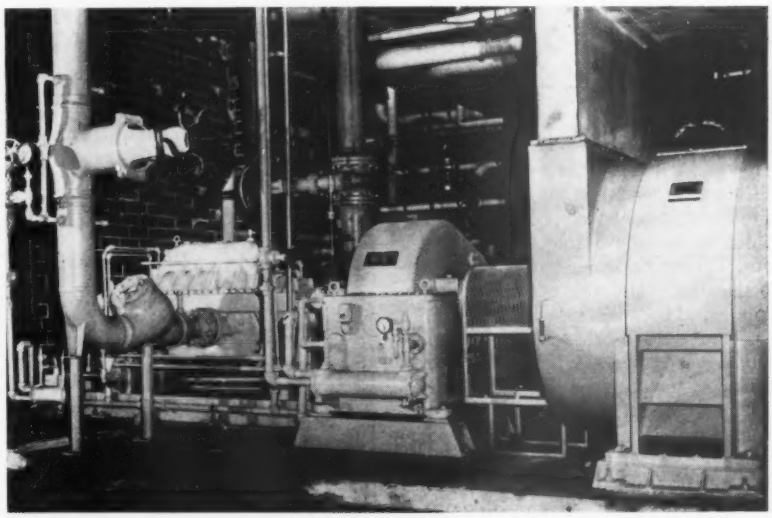
Highly automatic Ketchikan pulp operation requires 138 reducers

case history 28

One of the most unusual, and perhaps most difficult, power transmission applications in past months has been at the big Ketchikan Pulp Co. mill at Ketchikan, Alaska. Because of the remoteness of the site, far from the nearest industrial center, and because labor costs there are high, the mill's operation is necessarily automatic wherever possible. These factors were important to the plant's engineers particularly in the selection of the wide variety of power transmission units needed.

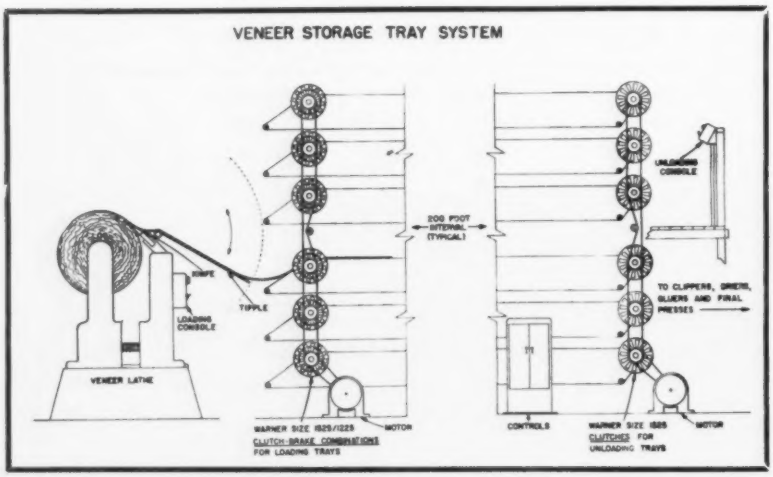
Western Gear Corp. was selected to supply 138 reducers for the big mill, in motor horsepower capacities ranging from 2 to 1,250 hp. The firm's application engineering department at Seattle worked closely with Ketchikan's engineers in the selection of the reducers and, as a result, over 35% of the units were standard stock ratios. Only two units were actually designed for special application, and the remainder of the drives varied only from standard units in that the ratio required was non-stock. With a few exceptions, all of the reducers were assembled in Western Gear plants complete with motor, reducer, high speed coupling, and low speed coupling or sprocket mounted on standard baseplates, thus eliminating expensive field installation time.

One of the two special units is a two-speed log haul drive, probably the first positive two-speed log haul with remote shifting control. The reducer drive unit here is a Western Gear DT-62-2S with ratios of 97.66:1 and 64.94:1 for use with a 150 hp.



Hydraulic pump at Ketchikan Pulp Co.'s mill in Alaska is driven at an optimum 4,020 rpm. by a 1,250-hp., 1,200-rpm. synchronous motor through a speed reducer.

at 1,080-rpm. motor. The complete drive unit consists of a reducer, motor, fluid coupling, brake, head shaft, and drive sprocket, all mounted on common framework, which upon installation became an integral part of the building's structure. The unit is equipped with pneumatic remote shifting control which enables the log barker operator to maintain a constant rate of output, with certain limitations, regardless of log size.



Multiple layer storage tray system, typical at Western plywood plants, is set up for production speeds of 600 fpm. Trays are coupled by a chain drive.

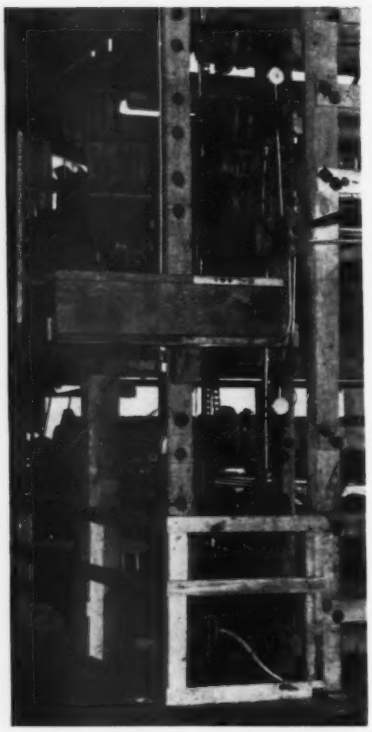
Electric brakes and clutches control plywood production

case history 29

The trend toward, and the advantages of, electrical equipment for automatic control of production is well exemplified at an Oregon plywood manufacturing plant. The multiple-layer storage tray system at this plant provides a specific illustration.

Here's how the tray system fits into the plant's production. After logs are brought into the mill, cut to necessary specific lengths, and bark removed, the log is chucked in a veneer lathe and trued up into a cylinder. As the log rotates against the knife, a continuous ribbon of veneer is peeled off, which in turn flows into the tray system. The trays provide storage space so that the remainder of the production end of the plant can operate without interruption while a new log is chucked up to start the cycle over again. At the out-feed side of the tray system are clippers that clip defects from the veneer and cut it to proper sizes for exterior finish sheets.

Many plywood plants in the West are now using similar tray systems, consisting of two to eight trays depending upon capacity required.



Power and control—d-c motor, clutches, and brakes—for tray system are shown here.

Power to the trays is usually supplied by two d-c variable speed motors, one for the loading side and one for the unloading side. A coupling from tray shaft to tray shaft is accomplished by a chain drive, and each tray is moved by energizing an electric clutch. Many of the Western installations, of which the Oregon plant pictured is typical, are set up for production speeds up to 600 fpm. At such speeds, momentum built up necessitates the use of an electric brake in conjunction with a clutch on the loading side. When a tray is filled the clutch is disengaged, and the brake immediately sets to prevent over-run. Simultaneously, the tipple feeding the tray system from the veneer lathe is moved to another open location and the clutch is energized to load that tray.

At the Oregon plant, and at a major share of the other Western plywood plants using tray storage systems, the brake and clutch units used are those manufactured by Warner Electric Brake & Clutch Co. Cost of installation has been a major factor, with the expensive piping and rotating air seals required for air systems eliminated. In the Oregon application, it is reported that $400 per tray was the saving, all factors considered. The Warner units are easy to install and usually require no maintenance during the life of the complete installation. Part of the savings results from the easy control of the entire operation and reduction of required labor man-hours. The control system is centralized with operator consoles installed at vantage points so that an operator can start or stop the operation at either end almost instantly, a decided safety advantage.

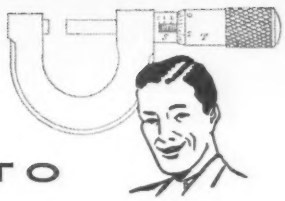
Internal-drive head pulley saves on space

case history 30

To expedite the loading and unloading of cargo, Pacific Far East Lines, San Francisco, Calif., recently bought six conveyors equipped with motorized head pulleys. These conveyors handle cement, grain, and copra in much shorter dock time than by previous laborious hand work. Once the cargo is loaded, conveyors are stowed on deck and used later for unloading at all ports of call.

Big feature of these conveyors is the Yuba-Schrock internal-drive head pulley. These pulleys save space (re-

"Calstrip® ROLLS STRIP TO



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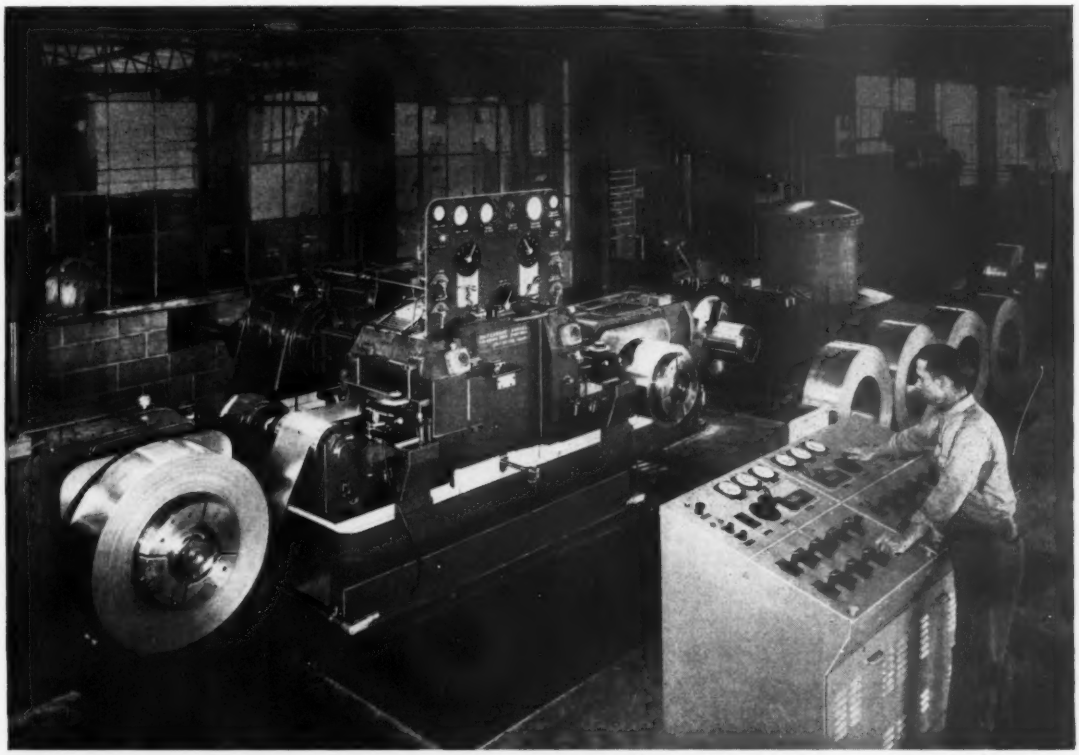

Calstrip's New Sendzimir Mill – the only mill of its type in the West

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Holding ultra-close thickness tolerances is a skill Calstrip is proud to offer customers. Long experience has proven that the ultimate in control of thickness variations is best achieved by cold reducing strip coils in narrow widths. That is why we roll coils 10 inches to 13 inches wide on our new Sendzimir Mill.

There are other advantages too – Manufacturers who have solved production problems by specifying Calstrip close tolerance, low carbon strip, discover that our strip steel also has these superior qualities:

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- **Strip is extremely flat**
- **Hardness and mechanical properties are precisely controlled**
- **Finish is fine grained, smooth and bright**
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Order Calstrip Steel for high speed production of parts which are stamped, drawn, or formed. Your plant will produce more parts per ton of steel with fewer rejects – your products will function better and look better.

Let our sales engineers know about your requirements for low carbon, spring and alloy steel strip, as well as aluminum coil stock.

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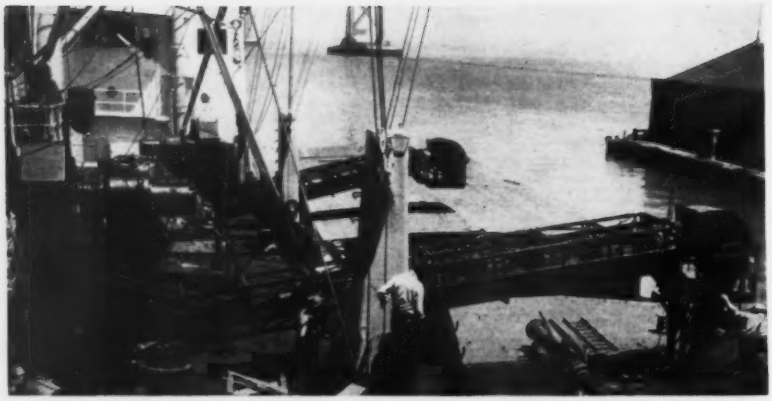


Drives for Pacific Far East's loading-unloading conveyors are contained in head pulleys. Operating in oil, a monthly oil level check is the only upkeep required.

quiring no more than a normal idler pulley) because they are so designed that the pulley shell rotates around the electric motor and reducing gears—which are held stationary. There are no sprockets, chains, shafts, or V-belts to cause unsafe operating conditions. A 31-ft. extension of Travi-4 wire plugs into an electric outlet on deck. Motors of each pulley are 3-phase, 60-cycle, 440-v., 5-hp. units, that operate at 76 rpm. Rotating drum of the head pulleys is of 20-in. diameter and 26-in. width. All moving parts are fully protected against weather, grit, and dirt. Assembly runs in oil. Only maintenance required is a monthly check on oil level level, and a change of oil annually.

This equipment was installed on Pacific Far East's ships by Stephens-Adamson Mfg. Co., San Francisco.

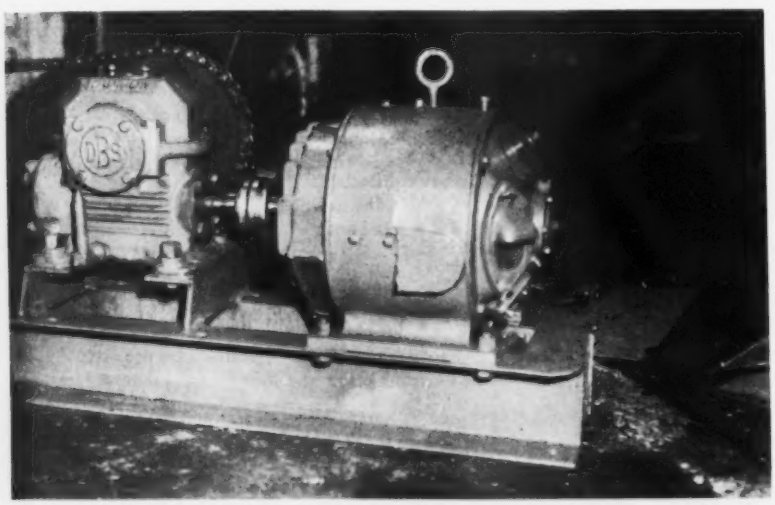
Six worm gear speed reducers save Oregon plant $1,326

case history 31

Selection of drive equipment to be installed on equipment at Murphy Logging Co.'s new Minam, Ore., lumber mill was the product of three-way thinking and engineering. The logging firm was assisted in this respect by Portland Sawmill Manufacturing Co., suppliers of the finished machinery, and Zidell Machinery and Equipment Co., industrial distributor firm, both of Portland, Ore. Six worm gear speed reducer complete drives selected for the system represent a saving of $1,326 or about 30%, when compared to the cost of helical gear units also considered.

Reducers used were David Brown Radicon units. A 15-hp., 60:1 unit drives the burner slab and sawdust conveyor; a 10-hp., 60:1 unit is used on the main refuse conveyor; the live log deck is powered through a 7½-hp., 60:1 unit; a 5-hp., 50:1 unit serves the transfer chain from headrig and edger to trimsaw; the main headrig roll case is powered by a 3-hp., 40:1 reducer; and a 2-hp., 40:1 unit is used on a strain device on the band headrig.

While the helical units would have provided about 10% greater efficiency than the worm gear units selected, it was felt that the added expenditure involved in the purchase of the helical units was not justified for these particular operations. Among those features of the Radicon worm gear reducers contributing to high efficiency are: involute helicoid teeth which provide a large zone of contact, centrifugally cast bronze gears meshing with high alloy steel hardened and ground worms, and fan-cooled casings which provide increased load capacity. Worms are ground in two separate operations to maintain the correct involute profile on both faces of the teeth.



Although 10% lower in efficiency than helical units considered for installation at Murphy Logging's new mill, worm reducers were considered adequate for this particular application and cost less.

Gearmotor, chain drive, guts of bulk handling system

case history 32

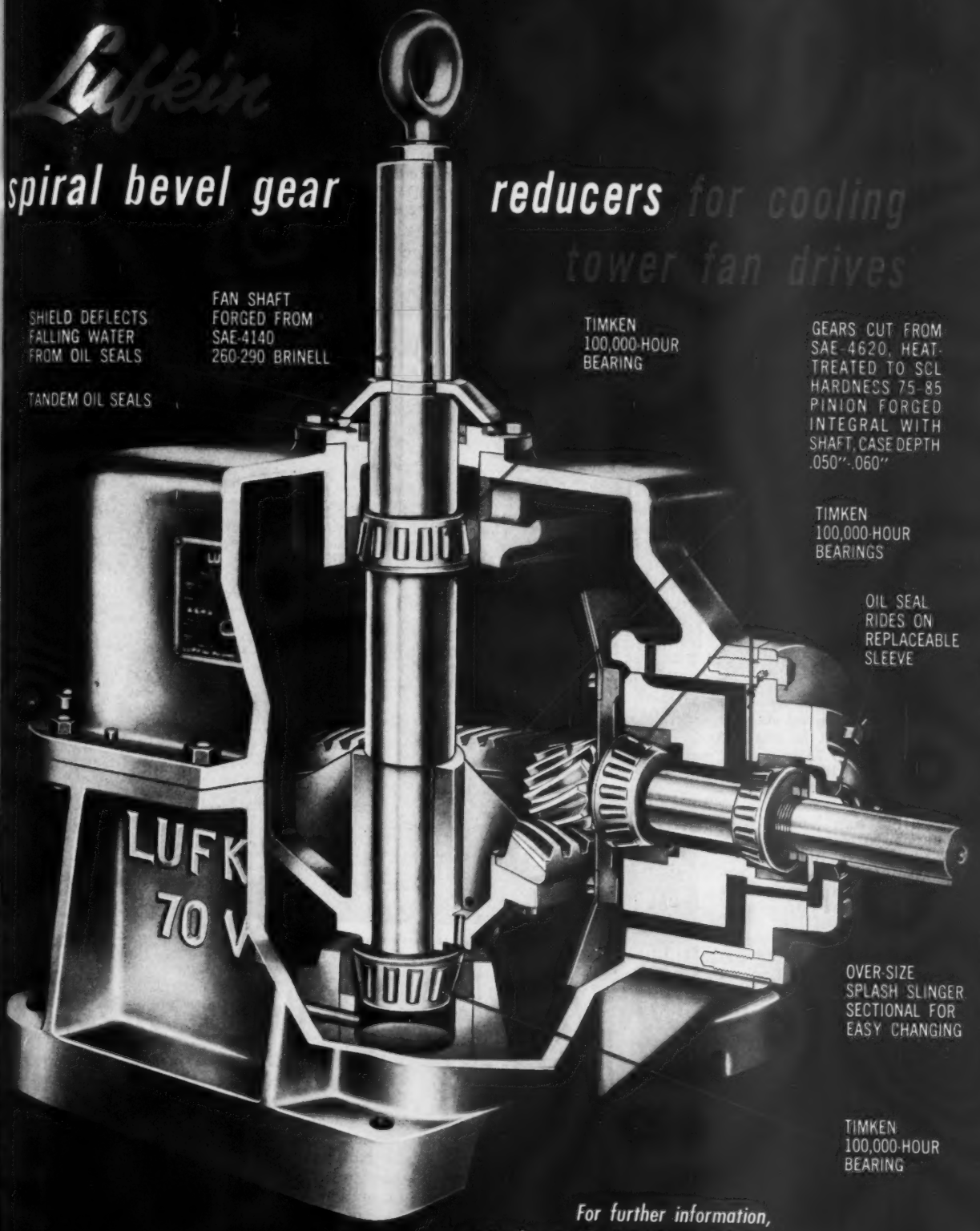
Continuous-flow processing, from delivery of basic ingredients to arrival at modern candy-making machines, is a major key to production economies at Tuxedo Candy Co., San Jose, Calif., subsidiary of Safeway Stores, Inc. Tuxedo's new plant there, with 190,000 sq. ft. of production space, is ranked as the largest candy plant west of the Mississippi with a daily production capacity of 100,000 lb.

Large quantities of bulk sugar, both beet and cane, are required, and special attention is given to receiving, handling, and storage facilities for the sugar. Both types of sugar arrive at the plant in center-dump trailer tank trucks. Handling systems for both are similar.

In the case of the beet sugar, the sugar is discharged by gravity from the truck through a flexible chute into

For more details, adv. opp. pg., circle No. 39 on Reader Service Postcard →

Lufkin spiral bevel gear reducers for cooling tower fan drives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a receiving hopper mounted on a 24-ft.-long Link-Belt screw conveyor. This unit is slightly inclined, completely galvanized, and has a 12-in. diam. screw. Lignum vitae bearings are used to prevent bearing metal or grease from contaminating the sugar. The drive for this conveyor consists of a 5-hp. motor, Link-Belt DM-10 gearmotor, and Link-Belt RC-80 precision steel roller chain drive.

The screw conveyor discharges into a Link-Belt 610 loop-type Bulk-Flo, a self-feeding, self-discharging combination elevator and conveyor. This 38-ft.-high unit is driven by a 7½-hp. motor, Link-Belt DM-50 gearmotor, and RC-120 roller chain to give a speed of 56 fpm.

The Bulk-Flo discharges via chute into a 24-ft.-long screw conveyor which delivers the sugar either into a 3,000-cu. ft. insulated storage bin or, if necessary, into a weigh hopper inside the plant. The screw conveyor has opposite hand flights on each side of the chute. Thus, the sugar will move in one direction or the other depending upon where it is deposited into the conveyor. The drive consists of a 2-hp. motor, DM-10 gearmotor, and RC-60 roller chain.

The storage bin has a hopper bottom, and when sugar is to be withdrawn, it passes by chute into the first screw conveyor. There is an air-operated, rotary cut-off valve on this chute, which is remotely controlled.

The entire system provides vapor-tight sealing, thus guarding the sugar against moisture and dust. It also operates just as efficiently when partially loaded as when fully loaded.

This is a description of only one phase of the efficient Tuxedo operation.

Constant speed drives on these can lines were causing cable wear on backed-up cans. Now can line speeds are varied to meet filling department needs.

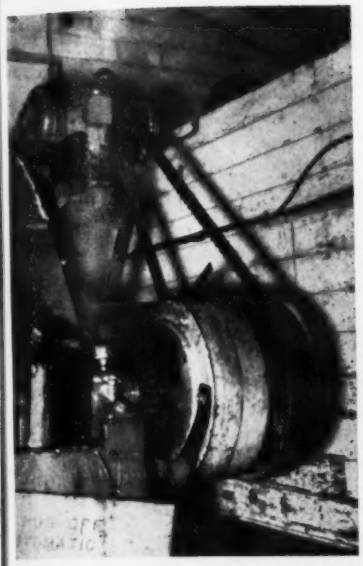
Variable speed drives control can lines, eliminate can damage

case history 33

Bercut-Richards Packing Co. in Sacramento, Calif., has eliminated damage to cans on its 2 and 2½-lb. can lines through the use of variable speed drives. The cans, traveling from the can plant to the filling operation, are carried on cable conveyors which were formerly driven by constant speed motors.

Due to varying requirements in the filling operation, and a varying need for cans, the cans often had to be backed up, but the conveyor was not shut down. Therefore, the cable moving against the bottoms of the stopped cans was scoring and burning them.

Driven now by Reeves Pulley variable speed drives, the conveyor lines are manually controlled by an operator who also patrols the lines to upright the fallen cans—a job which formerly consumed all of his time. The flow of cans into the filling operation is now only adequate to meet requirements, and no cans are lost due to damage from the cable.



Installed here on a drive unit consisting of a 3-hp. motor and a 13:1 speed reducer, this dry fluid drive stops breakdowns.

Dry fluid drive tames jerky, damage-prone set-up

case history 34

Engineers at Bercut-Richards Packing Co., Sacramento, Calif., foresaw a breakdown in their waste-water screen shaft recently and prevented it with the installation of a dry fluid drive. Revolving to filter solids from waste water before it leaves the plant, the screen always started jerkily, placing a high degree of stress on the shaft. It was only a matter of time, operators observed, until the shaft would weaken and twist off.

Since the dry fluid drive, a Dodge Flexidyne unit, was installed on the drive, which consisted of a 3-hp. electric motor and a 13:1 speed reducer, starting and operation have been smoothed out completely.

A measured amount of heat-treated steel shot acts as the "fluid" in the Flexidyne. Contained in the housing which is keyed to the motor shaft, the shot—termed flow charge—is thrown by centrifugal force to the perimeter of the housing, where it interlocks between housing and rotor, which transmits power to the load. After a momentary slip between housing and rotor the two become locked together and achieve full load speed, operating without slip at 100%

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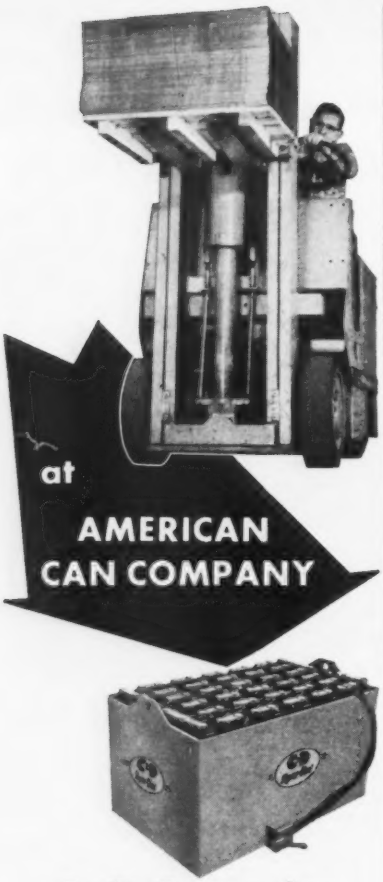

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efficiency during the running cycle. Thus, the motor picks up the load gradually, resulting in longer life for both the drive and driven mechanism.

During operation at normal speeds, no slip is encountered. Thus, in addition to positive speed control, there is no extra heat and no power loss.

New belt system stops slippage, boosts efficiency

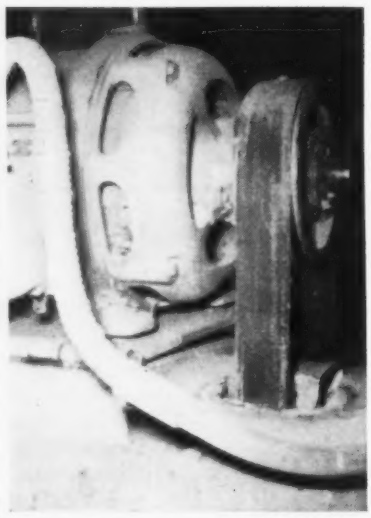
case history 35

When you are processing material with air provided from fans, top performance is required of the fans at all times. At San Joaquin Cotton Oil's Mendota gin near Fresno, Calif., cotton is carried through the ginning process by a combination of air power and screw conveyor.

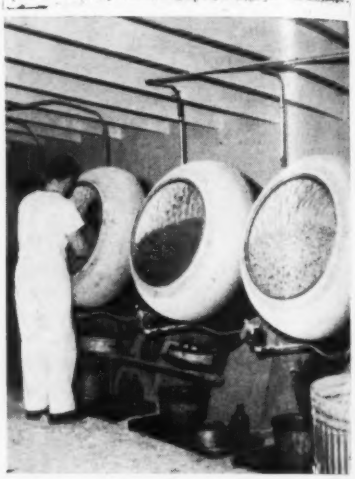
At one point in the process, lint which has been separated from the seed is condensed by a catch-screen. The lint is forced against the screen by a blower and a Hartzell exhaust fan behind the screen draws the air through the screen and out of the condenser.

When representatives of the Lummus Cotton Gin Co. were checking the system they found that performance of the exhaust fan was being reduced by slippage of the V-belt driving it. To remedy this situation they installed a Browning Poly-V drive. This eliminated the slippage and restored the fan to maximum performance.

The Poly-V drive consists of rows of parallel V-belts molded as a single unit by a flat-belt top. They run on matching sheaves. An even distribution of the drive load is obtained through the groove arrangement and the welding of the work potential of several V-belts.



Exhaust fan on San Joaquin Cotton Oil's Mendota, Calif., gin is driven by Poly-V belt.



Down-time on White Candy Co., San Francisco, candy tumblers costs about $15 per hour.

Bearing replacement kit saves $30 in two breakdowns

case history 36

Down-time costs the White Candy Co., San Francisco producer of 7,500,000 lb. of candy per year, approximately $15 per hour. Realizing the importance of reducing costs involved in equipment breakdown, the plant purchased a Boston Gear Bost Bronz Bank, a kit of replacement bearings.

Because the cost of purchasing enough bearings to meet any possible emergency was too high, the plant often found it necessary to lose more than an hour per breakdown to stop production and machine a bearing. To go out and purchase bearings as needed required this much time.

Cost of the Bost Bronz Bank, which includes two each of 47 sizes of oil impregnated bronze bearings, was 50% lower than individual purchase cost. With bearings on hand, the firm recently saved $30 on each of two breakdowns of its candy tumblers through a reduction in down-time involved.

In 1937, when the Hood River Apple Growers Assn. built its cold storage plant, Gargoyle lubricants were selected to protect its heavy-duty compressors.

Today, after more than 18 years of continuous operation, plant engineer Fred Hixon reports all compressor machinery at the Hood River, Ore., plant – largest apple storage west of the Mississippi – running at top efficiency, lubricated by means of a Manzel automatic force feed console installed at the suggestion of General Petroleum's lube engineers.

Like so many other leading West Coast firms, the Hood River Apple Growers have found it pays to deal with General Petroleum. If you want to lengthen machinery life, cut maintenance costs and reduce lubricant inventories, get in touch with your nearest G. P. office today – your best bet for products and service you can count on!

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Plant engineer
Fred Hixon

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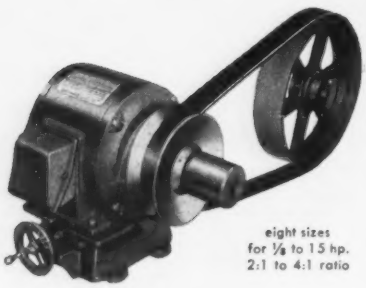

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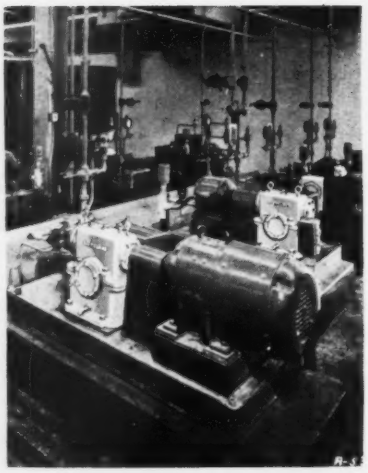

A variation of stroking speeds is needed on these pumps feeding chemicals to treat water at Valley Steam Plant in California.

Worm reducers give varied pump speeds

case history 37

Accurate control of proportioning and volume of chemicals used to treat water for prevention of scale and corrosion is essential to the effective operation of the new Valley Steam Plant of the Los Angeles Department of Water and Power. To obtain accuracy required, ten Cleveland Worm Gear speed reducers were selected to drive Milton Roy pumps with the variation of stroking speeds necessary.

Power is transmitted with a smooth, uniform torque flow although the units require a minimum of space.

Tough belt drive problem solved by grommeted V-belts

case history 38

Here's how a Western oil company solved a V-belt problem under tough conditions. V-belts are used to drive a gasoline-powered oil well pump jack in pumping oil directly from the well to the pipeline. Ordinary V-belts wore out in six weeks. Some lasted only three days. The exposure to

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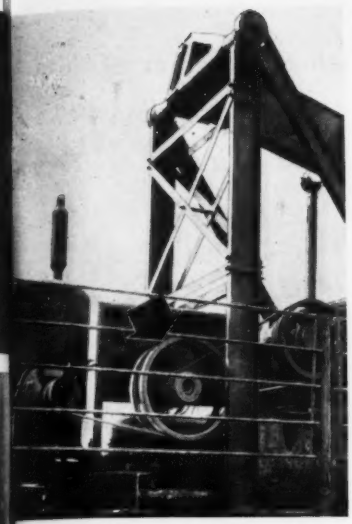


…gers of weather, oil, and the weight of a …60-lb. floating pulley on this oil well pump …posed a problem in drive belting.

…eather, oil, and the weight of a …60-lb. floating pulley were more than …hey could stand.

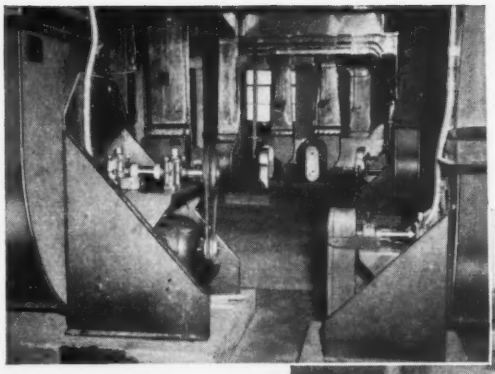
Then the oil company tried a set of grommet V-belts made by the B. F. Goodrich Co. After six months the grommet belts were still on the job and going strong. They tripled the service of the former belts and helped to reduce operating costs. (The well is a "sander" and if regular pumping is not maintained, the whole pumping mechanism has to be pulled from the …,000-ft. well, cleaned, and reinstalled.) The drive operates 24 hours a day, seven days a week.

B. F. Goodrich grommet V-belts have no center cords. All of the load-carrying cords are concentrated in twin grommets that are endless without any overlapping cord sections.

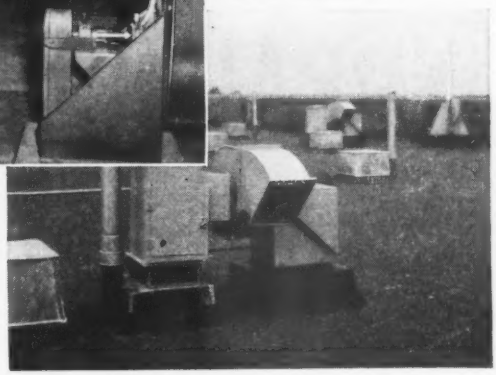
case history 39

Ten V-belts do the job

…hasta Box Co., Redding, Calif., hit an emergency breakdown on the main drive of its …nd mill and placed 10 Durkee-Atwood …tandard E300 multiple V-belts on the unit to …eep it in operation. Normal load on the ma…hine is 250 hp. and overloads reach 400 hp. …fter two years continuous service the belts …ere reported to still be in good condition.



INDOORS — VENTILATION OF ZONES OR WHOLE BUILDINGS Compact "Buffalo" Belted Vent Sets are easily installed singly or in groups (at left) for varying volume requirements, or for different zones — and new fans can be easily added as ventilation requirements increase.



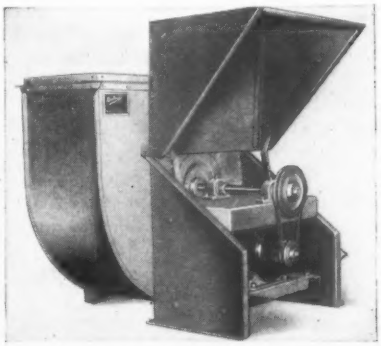
OUTDOORS—VENTILATION THAT DOESN'T USE FLOOR SPACE Furnished with all-weather drive, husky Belted Vent Sets are ideal for roof or other outdoor installations. Range of capacities is 500 cfm to 20,000 cfm in this line of extremely quiet, efficient ventilating fans.

FAN FLEXIBILITY...

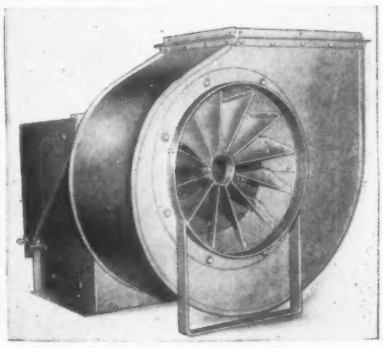
TO SIMPLIFY YOUR JOB PLANNING

"Buffalo"

BELTED VENT SETS



Whether you're planning a large or small air moving job, these fans will fit right into your plans. Installation can be indoors or outdoors, and their light weight and compact size simplifies the job. You can get large capacity at small-fan cost with multiple-fan installations—for complete flexibility of operation. And when you put "Buffalo" Belted Vent Sets into the plan, you give your customers "Q" Factor performance — built-in Quality that means long life and satisfaction. *Write for new Bulletin 3720A* and data on new model Belted Vent Sets now being used for small induced draft applications.



ADJUSTABLE MOTOR MOUNT permits easy change of pulleys and belts for capacity changes after installation. (See upper photo).

HIGH PERFORMANCE is built into "Buffalo" Belted Vent Sets. Note inlet guide vanes which reduce noise and stabilize performance.

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PNEUMATICS and HYDRAULICS

12 selected examples of how pumps, valves, couplings, air motors, and cylinders are reducing costs for manufacturing plants in the West

Steam traps control pressure to increase food production by 20%

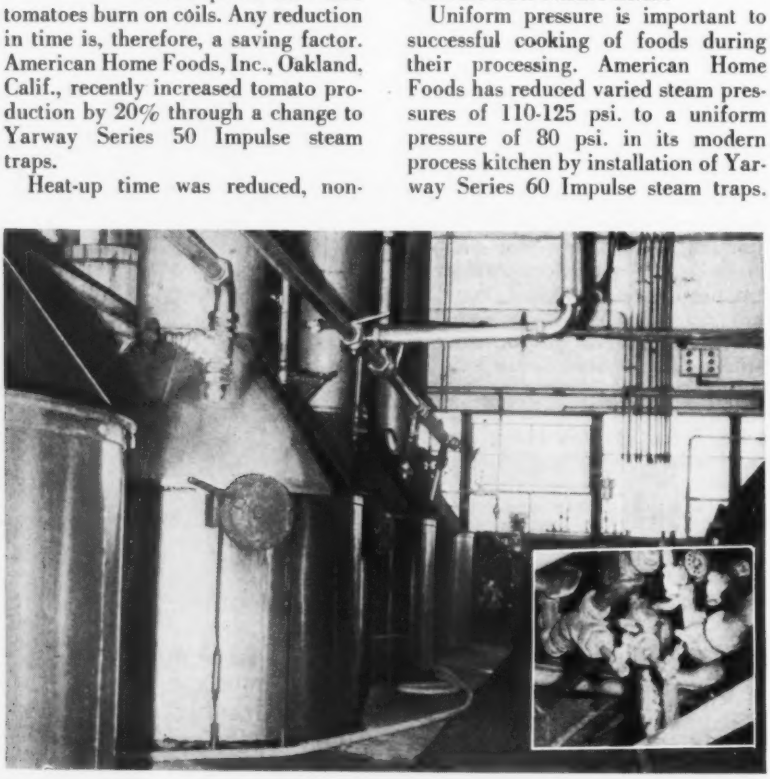
case history 40

Cooking of tomatoes in food processing plants must take place at an extremely fast rate because slow boiling reduces production and tomatoes burn on coils. Any reduction in time is, therefore, a saving factor. American Home Foods, Inc., Oakland, Calif., recently increased tomato production by 20% through a change to Yarway Series 50 Impulse steam traps.

Heat-up time was reduced, non-productive time for cleaning of fouled and burned coils in the kettles was greatly reduced, and uniform high temperature was maintained. Illustration shows the traps on a 1,000-gal. stainless steel tomato kettle.

Uniform pressure is important to successful cooking of foods during their processing. American Home Foods has reduced varied steam pressures of 110-125 psi. to a uniform pressure of 80 psi. in its modern process kitchen by installation of Yarway Series 60 Impulse steam traps. Food batches are cooked as effectively and as quickly as before.

Both installations were engineered by the E. S. Bottomly Co., San Francisco distributor firm.



Shown inset above, steam traps on these 1,000-gal. tomato kettles at American Home Foods, Oakland, Calif., reduced time required for heat-up and time lost in cleaning fouled coils.

High pressure pump solves maintenance cleaning problem

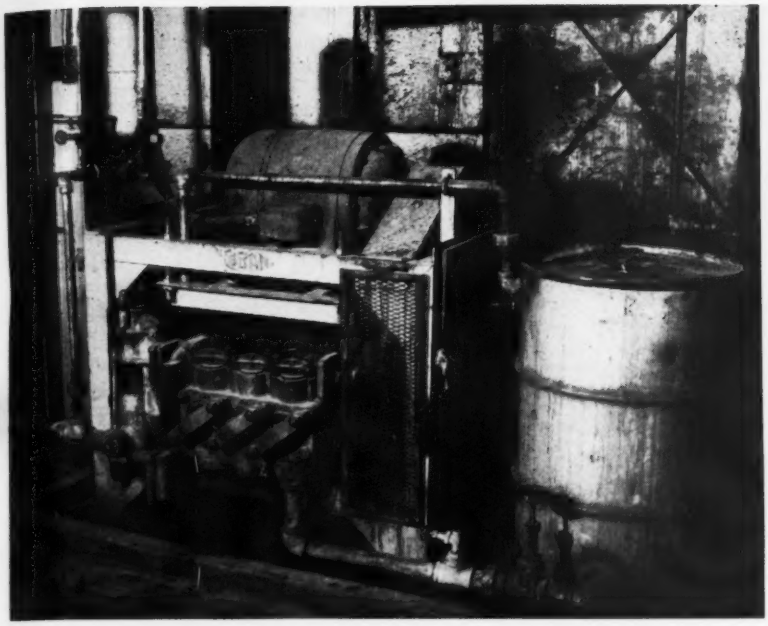
case history 41

Problem at Owens-Corning Fiberglas Corp. in Santa Clara, Calif., was the need for a high pressure pump for use in maintenance cleaning operations. Straight water had to be pumped effectively, containing no abrasive or solvent, for cleaning a continuous 80-in. wide chain that becomes covered with liquid fiberglas during operations.

A high pressure hydraulic pump manufactured by John Bean Div. of Food Machinery & Chemical Corp. was installed and is doing the job with a minimum of expense or breakdowns, according to Plant Engineer Border M. Melton, who is in charge of the plant's maintenance operations.

Much of the collected matter is first removed with potash, and the residue is blasted off the chain by combining an oscillating jet and a refined nozzle with 500-lb. pressure.

The pump is part of a John Bean line that has capacities from 1 to 10 gpm. and pressures from 100 to 500 psi., and is designed for use in applying oil and water paints, operation of hydraulic presses, and for water supply pumping, among other uses. Three porcelainized cylinders and self



Water is pumped through this system at 500 psi. and, via an oscillating jet and a refined nozzle, blasts liquid fiberglas residue from a continuous chain 80 in. wide.

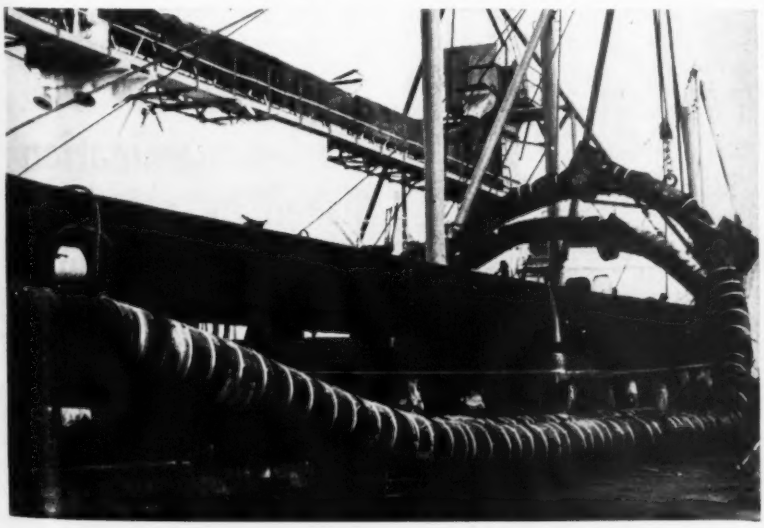
expanding plunger packings enable the model to pump any fluid including those with abrasives and at temperatures up to 180 deg. F. at 50 gpm. The pump unit comes with a 15-hp. motor, or gasoline engine.

Dry cement pumped through big tough hose at 20 bbl. per min.

case history 42

Dry cement is hard to handle. In sacks, it is heavy. Loose, it is difficult to transport. Here is how one Western firm solved the problem with a smart answer. That company pumps dry cement through hose to get it into the holds of ships faster and cheaper than any other way.

It's a 10-in., 6-ply rayon reinforced hose with 5/32-in. spiral cable reinforcement made by the B. F. Goodrich Co. The company uses one 30-ft. length and one 20-ft. length to do the job.



Two lengths of this 10-in., 6-ply, rayon-reinforced hose, one 20 ft. and one 30 ft., carry pumped dry cement into the holds of ships at a rate of 20 bbl. per min.

Without the spiral cable reinforcement developed by Goodrich, the hose would collapse when the pump is turned off, putting permanent dents in the coil of solid steel wire that is buried in the rubber of ordinary hose. The special steel cable in the hose makes it flexible as well as strong, so it always returns to full round shape under pressure.

The big, tough hose after carrying more than 1,500,000 bbl. of cement, still showed no sign of wearing out. It can transport dry cement at the rate of 20 bbl. a min.

Oil drums filled automatically at 275 gals. per min.

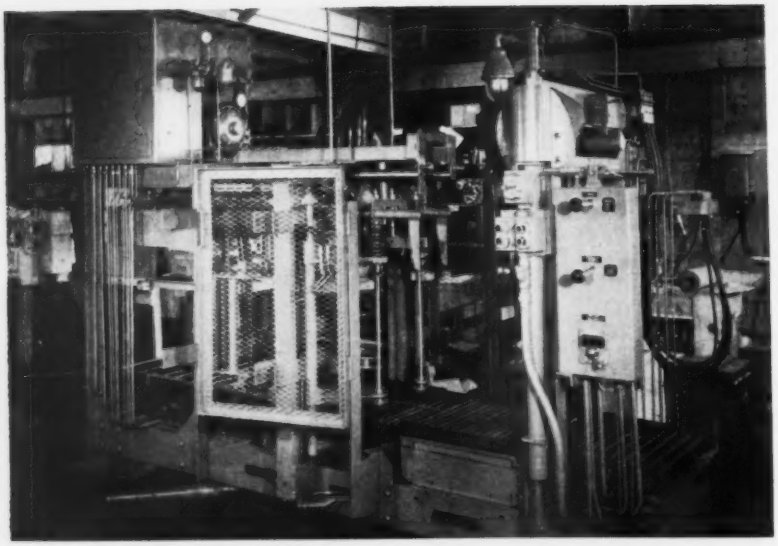
case history 43

When Standard Oil Co. of California concluded that the usual method of manually filling 55-gal. oil drums at its Richmond, Calif., refinery was too slow and costly, The Rucker Co. of Oakland, Calif., was called in, and together it was decided that some automatic method for filling these drums could be successfully designed and manufactured at a cost which would make it profitable for the refinery. Months of design and engineering work by engineers of both firms resulted in an efficient automatic drum filler.

Now in operation for a long period, the drum filler by actual test more than triples the output of an average manual filling station. It has a capacity in excess of one thousand 55-gal. drums per 8-hr. shift with a single operator. Even if operated at half capacity, the unit reduces the cost of drum filling over manual type operation by many thousands of dollars a year.

The Rucker automatic drum filler is a flexible and versatile machine. It permits installation on either lefthand or righthand filling lines, accommodates nearly all types of drums, automatically compensates for variation in tare weights of drums, and provides quick change from one product to another. A 2-station machine, it operates on a continuous basis and requires only a single attendant.

Accepting drums at the upstream station, the machine automatically



Capable of filling over a thousand 55-gal. drums with oil each 8-hr. shift and requiring the service of only one operator, this two-station drum filling machine has tripled production for Standard Oil Co. at its Richmond, Calif., refinery.

loads and aligns the bung openings and positions drums for passage into the second or filling station. In the filling station, variations in tare weights are automatically offset and the filling operation begins immediately, at rates up to 275 gal. per min. Automatic reduction of flow just prior to actual cutoff assures minimum loss through overfill.

The basic design of the drum filler provides for maximum safety during normal operation. The interlocking system of fail-safe devices, submerged filling to prevent static spark discharge, the remote position of the operator, and the extensive use of hydraulic and pneumatic controls, combine to accomplish this high degree of safety.

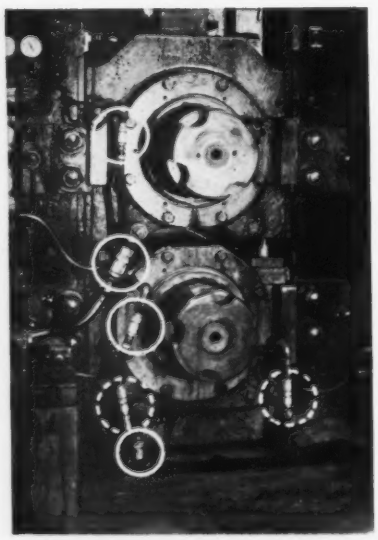
Lubricant line couplings reduce down-time for mill roll changes

case history 44

A barrier to high and profitable output of modern strip rolling mills is down-time required for changing mill rolls. Here is how one strip mill has reduced this profit-eating down-time to a minimum.

First step in minimizing lost production time during changes of the rolls was to keep replacement rolls in reserve alongside each mill at all times. The mill is designed for rapid roll change, roll bearing blocks being keyed into place. This permits removal and installation of roll and its bearing blocks as a unit.

However, one difficulty usually slows down the entire operation. That is the coupling and uncoupling of fluid lines connected to the rolls. Fluid lines on the rolls carry a heavy flow of lubricant for both cooling and lubricating purposes and they feed high pressure hydraulic fluid into hydraulic lifting jacks which raise the upper set of rolls when a large clearance between work rolls is required. Lines connect to pipe fittings which project from the bearing blocks.



Full circled here are couplings on lube lines for mill rolls. Couplings on high-pressure hydraulic lines are broken-circled.

Originally the connection was made by threaded fittings—unions—which had to be disconnected each time a roll was removed and reconnected after the new roll had been placed on the mill. Cramped space and surrounding projections made the use of a wrench to loosen and tighten fittings extremely difficult. Furthermore, extreme tightening of fittings on the hydraulic fittings was necessary due to the high pressure of the fluid carried.

It was decided that the threaded fittings should be replaced with quick-connect and disconnect couplings, but severe requirements were imposed by the high pressure of the fluid and the danger of leakage causing fires. It was also essential that the coupling permit full swiveling of flexible hose about the stationary pipe fitting to avoid hoses twisting and eventual breakage. Of course, the time problem remained and fastest disconnect-connect action was desired.

The mill found that Titeflex Quick-Seal coupling met those requirements. A ring seal which abuts against the nipple when the coupling is closed provides a tight seal as soon as the coupling is connected. Fluid pressure in the line expands the lips of the seal making the coupling leakproof at high pressures.

An additional reduction in time was gained due to the Quick-Seal coupling's automatic closure action when it is disconnected. Both ends of each line are closed automatically by a check valve in the coupling which snaps closed the instant the disconnect is made. This eliminates the necessity for shutting off valves on the fluid lines.

Fuel contamination licked by aluminum pipe and couplings

case history 45

Inclusion of foreign matter in aviation fuels can prove serious. Nobody knows this better than the aircraft industry and the United States Air Force, which zealously guard the purity of their fuels from storage to delivery.

Recently, the Air Force began employing aluminum pipe, which has

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"Performance Record...EXCELLENT!" That's how Harold K. Fox, president of Hartman Concrete Materials Company of Bakersfield, California describes his 3-White 3000's, used with 6½ yard mixer units and with 18 ton semi tractor units for hauling rock and sand.

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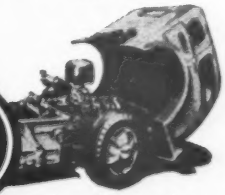

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such excellent corrosion resistant properties, and Tube-Turn aluminum SF (scale free) welding couplings in the fabrication of airport fueling systems. The result has been to eliminate the risk of pumping products of corrosion and welding scale and icicles into aircraft fuel tanks during servicing operation. The Boeing Airplane Co., which never overlooks a bet where safety is concerned, employed the same type of construction for its expanded fueling facilities at Seattle. Boeing's lines are of 3-in. and 6-in. 6061-T6 (61S-T6) aluminum with the SF couplings of matching material. The high pressure, high capacity system permits as many as four B-52s to be refueled at once. The Tube-Turn products were furnished by the Palmer Supply Co. and the Northwest States Supply Co. The job was engineered by Bouillon & Griffith. Wenzler & Ward made the piping installation.

The Tube-Turn SF coupling consists of two forged halves with hub ends that fit pipe and welding fittings of corresponding nominal pipe size. When the halves are joined, a cavity is formed just below the welding bevel. It makes possible complete penetration in the final weld with no danger of burn-through or formation of scales and icicles on the inside of the pipe.

UNRETOUCHED PHOTO

Main lobby at the Lockheed Aircraft Corporation offices in Burbank, California.

A Reception Area that Visitors Admire

Like other floors in Lockheed executive and engineering buildings, the specially selected imported cork floors of the main reception lobby in Building 61 are beautifully maintained with Columbia **Snug** Floor Wax. Used by distinguished guests and executive personnel, these floors must be kept glistening and completely safe despite heavy daily traffic. Columbia Wax was specified by Lockheed after rigid on-the-floor comparative tests.

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These air-powered drills in one hour can tap two 3/32-in. holes in 154 die cast aluminum power heads for temperature regulators.

Air-powered drills speed production of angled holes

case history 46

Minneapolis - Honeywell at Los Angeles set up this inexpensive special machine, built around two Bellows Hydrair drill units. This flexible unit required little time for design and construction, and capital investment was low. Yet it has successfully met the problem of keeping costs on these minor operations within reasonable limits.

The part being worked is a die cast aluminum power head for temperature regulators. Two 3/32-in. holes are drilled at different angles in the power head. Tolerances maintained are plus or minus .005 in.

Parts are hand loaded into an air-powered clamping fixture. A manually operated valve operates the air clamp. A pushbutton starts both Hydrair units and drilling is done simultaneously. Spindle speed is 17,000 rpm.

Floor-to-floor time is 2½ sec. Production rate is higher than anticipated

so the operator produces only the 154 pieces per hour required. He uses the remainder of his time doing other work.

The Bellows Hydrair drill unit used in this application is an all-pneumatic device, with air-powered spindle, air-powered traverse, and adjustable hydraulic control of feed rate. It has a choice of five spindle speeds from 500 to 17,000 rpm. The built-in Electroaire valve provides the safety and wiring simplicity of low voltage (8 volts) control. The unit may be used for single or continuous cycle operation. Stroke length is zero to 4 in. Drill capacity: ¼ in.

New type ¾-in. valve with Brinalloy seats and disk proved its merit when tested on an underground steam line.

Much throttling tests new valve's tough seat and disk

case history 47

An important problem at a chemical plant involved an outdoor steam blow-off line. This steam line is continuously being opened and closed during operating periods, and is commonly used throttled down to about half of capacity when in use —two conditions that greatly increase wear on the valve. The steam line is fed from the boiler house by way of a furnace room. The valve is located at or below ground level in a slightly hollowed out area in gravel and ashes which cover this section, with the stem

Signode unitizing method speeds truck handling of heavy castings

A manufacturer in Alabama sought a safer, lower cost way to ship heavy-wheel castings by motor truck to Michigan. With the co-operation of Signode's fieldman, a special unitizing pallet pack was developed. First, a heavier, stronger pallet was built. Two layers of castings, separated by a wood frame, and similarly capped, were strapped to the pallet. Six bands of Signode steel strapping, spaced for maximum unitizing efficiency, were applied. The new method of shipping saved time in loading and unloading. Handling safety was greatly increased. Cost of the pallets was self-liquidating, because the receiver bought them for inplant handling and storing of castings, and for intraplant shipping.

Get in touch with your Signode Fieldman! He will be able to show you, too, how to make important savings in packaging, handling and shipping your products through the six basic unitizing methods. Quickest way to reach him is to write

SIGNODE Steel Strapping Co.

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. . . for more details, circle No. 49 on Reader Service Postcard

of the valve projecting clearly above ground.

When past valve installations required replacement at intervals of six months or less, various types were tried out, including most of the standard makes of valves. Recently a ¾-in. experimental valve with Brinalloy seats and disk, manufactured by the Lunkenheimer Co., was installed. It has served with complete satisfaction for over three years.

This installation of the LQ600 globe valve was one of some 100 test installations made by Lunkenheimer of the new seating material, called Brinalloy. Brinalloy not only has high Brinell hardness (600 Brinell seat and disk) throughout, but also has significant wear-resistant properties.

High Brinell hardness itself is not the entire answer to erosion such as is encountered in throttling service. The new seat and disk alloy developed by Lunkenheimer has proven to be more resistant to wear and corrosion than 500 Brinell stainless steel, and to outlast case-hardened stainless steel exceeding 1,000 Brinell.

Advantages of the LQ600 valve have become apparent during its long performance. Efficiency is improved, convenience in scheduling piping work is facilitated, and safety is given a boost. Experience at the plant has shown that this type of valve can be an efficiency, economy, and safety factor on any type of installation where the valve is likely to be often throttled—or frequently opened or closed.

Quick couplings and hose eliminate 26 shut-off valves

case history 48

At a blending plant of Standard Oil Co. of California's Richmond refinery, thirteen 3-in. pipelines carry different base stocks for blending. Three meters, with preset shut-offs, control the flow of any of the base stocks through two proportioning valves.

This arrangement permits combining any of the base stocks in groups of two or three stocks in any desired volume and in any proportion to produce the exact blend desired. Blended stocks flow directly from the blending plant to tank cars for shipment. This system permits storage of base stocks only and blending as required with infinite variation to meet requirements of different orders.

System involving quickly connected couplings enabled Standard Oil to eliminate storage of blended thinner. Required base stocks are mixed as the fluid is pumped into tank cars.

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ELPAR electric trucks give fume-free, pennies-per-day operation with minimum maintenance. As a *plus* benefit, ELPAR field engineers assist your men in proper preventive maintenance. This *free, personalized,* service adds many years of truck life.

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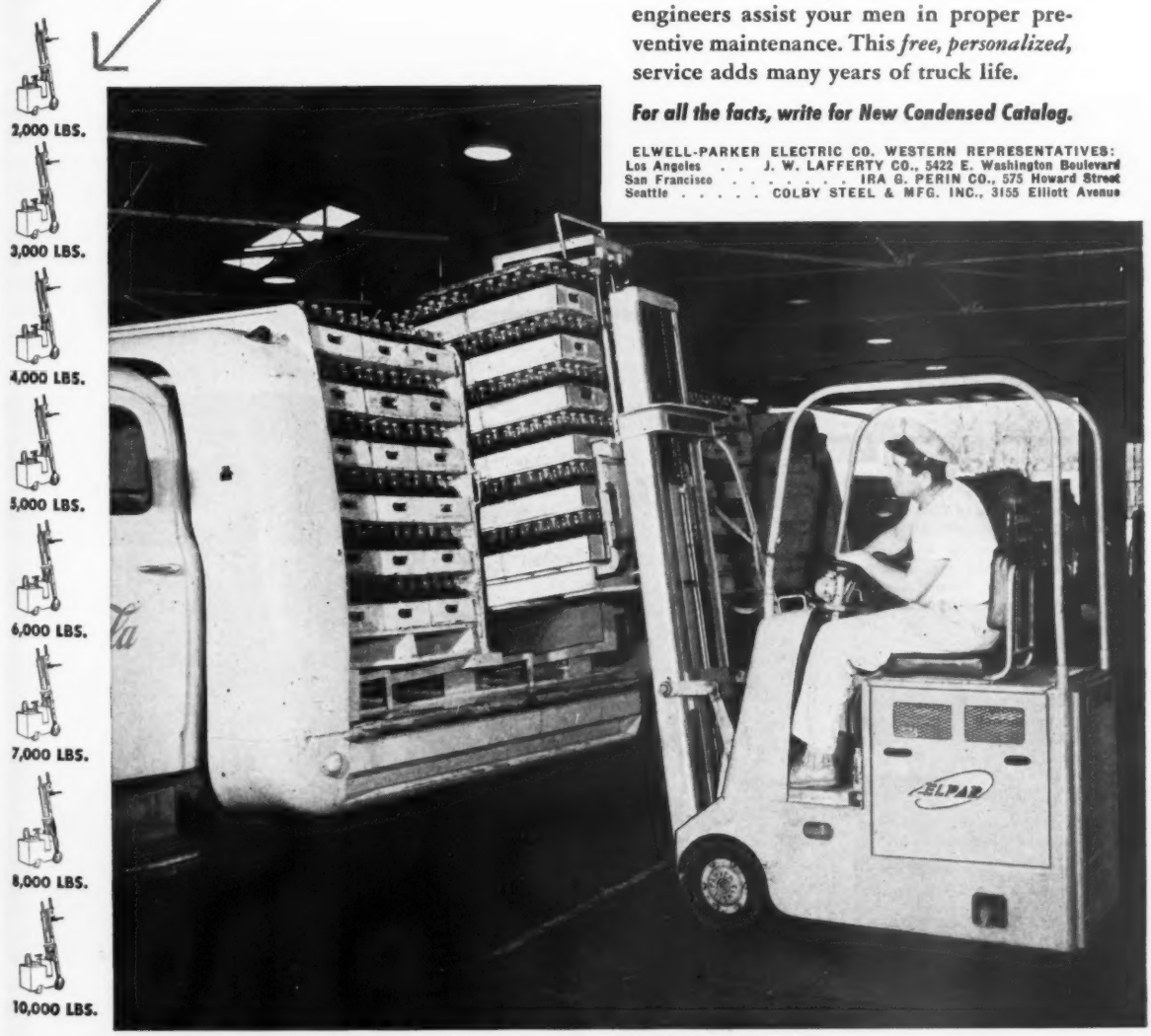

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Headquarters for RIVETS
Tubular, split and special cold-formed
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base stock lines to the meter inlets, flexible hoses and Snap-Tite quick couplings are used instead of permanent piping. Each base stock line is provided with a shut-off valve and is stubbed off with a 3-in. Snap-Tite nipple. A flexible hose with a 3-in. coupler on one end is connected to each meter inlet. With couplers and nipples so installed, any base stock line can be quickly connected to or disconnected from any meter. Jumper hoses with couplers on both ends permit connecting various base stock lines together if desired.

Installation of the couplings eliminated the need for 26 shut-off valves and associated headers and permanent piping. A large saving was made in plant space, which was critical in this location because of railroad clearance and other adjacent installations. The coupling installation cost was approximately one-third that of permanent piping because of the elimination of the extra valves. Contamination of base stocks by interflow through leaky valves is eliminated.

Changing of blends on successive orders requires quick changing of base stocks flowing to the meters. From 3 to 6 blends may be run in an 8-hr. shift. By means of the quick coupling, hoses are easily and quickly switched to base stock lines as required.

Thiokol packers used in the couplers provide tight no-drip sealing of the couplings with all stocks handled.

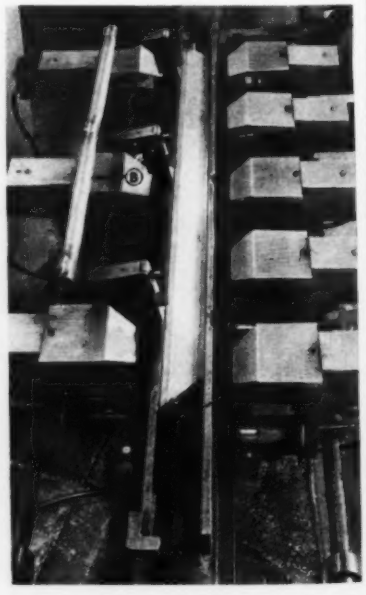
Air-powered automation in multiple drilling

case history 49

Rylock Co., Ltd., San Leandro, Calif., manufacturer of window screens and aluminum-frame screen doors, has a tooling problem typical of many plants turning out a wide variety of product sizes and shapes. Overall production is high, yet the "run" of any one size or type prohibits costly special tooling.

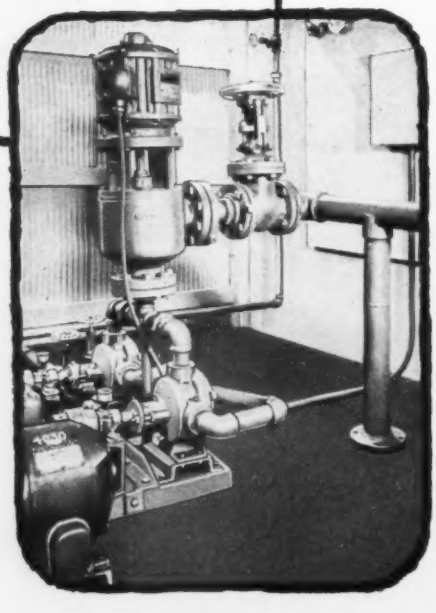
It's hardly a case for "automation" in the sense of tomorrow's pushbutton plant. Yet Rylock is enjoying the substantial savings of automatic production equipment today with air-powered equipment designed and built in its own plant.

A typical device is the automatic horizontal multiple drill pictured here. It is used to drill all holes on both edges of aluminum screen door rails simultaneously. The light independ-



Each drill in this multiple unit machine at Rylock Co., San Leandro, Calif., is advanced and retracted by an air cylinder.

Viking Pumps help Clopay Save $10,000 per year



Installation of two Viking Pumps and a continuous pipe line mixer enabled Clopay Corporation, Cincinnati, Ohio, to mix their own oil and resin coating solution for window shades. As a result, Clopay purchased materials separately in tank cars at 20% lower cost.

Because of Viking Pump's positive action, liquids are uniformly mixed in spite of widely varying viscosities, yet unloading requires less time than formerly.

If your plant has a pumping problem requiring accurate mixing, try Viking Pumps.

Write today for information and bulletin 56SA.

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E. E. Burton, 4432 Long Beach Ave., Los Angeles 58, Calif.
DeLaval Pacific Company, 201 E. Millbrae Ave., Millbrae, Calif.

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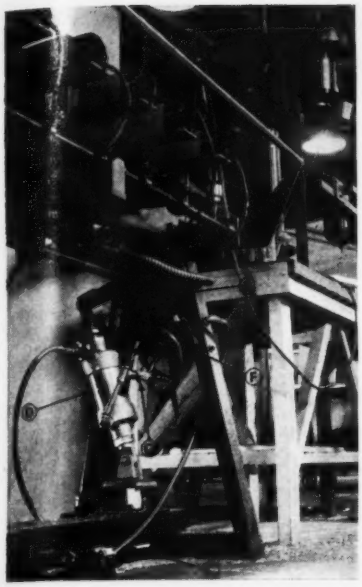
Pumps take over from containers to handle liquefied dry material

case history 50

The handling of dry material in liquid form has materially decreased handling costs, and thereby reduced labor costs in many Western industries. Notable advancements have been made, for example, in the food industry with the liquid handling of corn syrup, lard, and other commodities to replace the handling of dry or solid products in relatively small containers.

A specific example is provided by one phase of the operations at Tuxedo Candy Co., San Jose, Calif., subsidiary of Safeway Stores, Inc. Tuxedo's new plant there produces daily 100,000 lb.



Air cylinder, labeled D here, controls advance and retraction of air-power drill heads. It is operated by foot pedal (C).

ently-powered drill heads are movable to accommodate any desired horizontal drill spacing required for various door sizes.

Modernair air cylinders and valves manufactured by Modernair Corp., are used to advance and retract the drills.

Operator merely places work piece in jig against locating stops, pulls over hold-down fixture, and depresses Modernair foot operated valve (C). Provenair cylinder (D) advances to push lever attached to common horizontal feed shaft which advances drill heads. Feed is controlled by cam (E) on end of shaft which actuates the Modernair BV301 valve (F). Circuit provides rapid advance until cam actuates valve, which then diverts air through Modernair Flow Control valve (G) for controlled slow advance during drilling cycle. When drilling is completed, the operator releases foot valve, cylinder (D) piston retracts to reverse feed shaft motion and retract all drills.

Entire cycle, including loading and unloading workpiece, requires approximately 10 sec. It is estimated that drilling the eleven holes in the usual vertical drill fixture would require approximately 2 min. per work piece, indicating a saving of 110 sec. per piece.

If you want more background information about any cases described in this issue, write: Editor, Western Industry, 609 Mission St., San Francisco 5, Calif.

investigate

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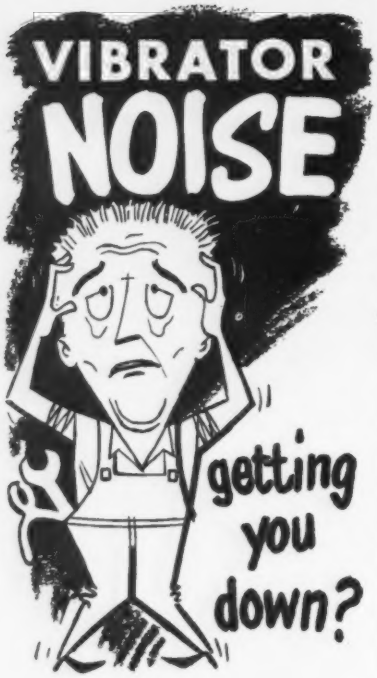

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These new vibrators operate on the eccentric-weigh principal—they make no more noise than an electric motor.

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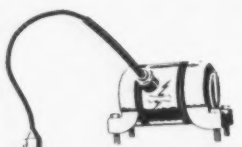

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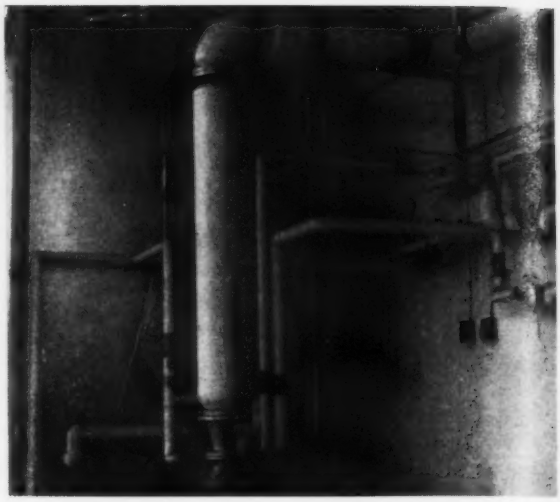
. . . for more details, circle No. 55

Pump (bottom of pic) feeds entire system with glucose. Steam coils in 25,000-gal. storage tank shown keep it fluid at 110 deg. F. and up, and pump feeds it into 900-gal. surge tank in plant. Mercoid switch starts feed pump when pressure drops to about 60 psi., stops it at 80 psi., to save wear on pump and eliminate manual labor.



of candy for some 1,100 Western stores.

A basic ingredient for candy is corn syrup or glucose. This liquid is difficult to handle because it requires heat of about 110 deg. F. to be fluid. Four large Blackmer steam-jacketed pumps were installed at Tuxedo to handle this liquid. In sequence, the first pump is used to unload tank cars, transferring the glucose to a 25,000-gal. holding tank. A second pump draws from this supply tank to pump the glucose to various points of use.

Lines are all jacketed with asbestos to prevent loss of heat. For different requirements at the candy production machines, desired batch requirements can be drawn off easily through the use of pre-set meters graduated in pounds.

Farther along the line, the glucose is drawn into large mixing vats, where dry sugar is added. This mix is con-

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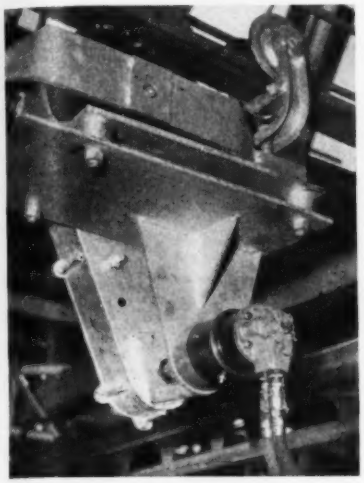
centrated, and two additional Blackmer pumps, of all-bronze construction for maintenance of purity, then transfer this liquid under pressure to points of use in cream and candy centers.



At 90 psi. air motor powering this overhead crane produces 0.9 hp. to carry a maximum overhung load of 800 lb.

Air motor stops, starts crane instantly

case history 51

Instantaneous, positive starts and stops are required from an overhead crane with a chain drive in an automotive assembly plant at South Gate, Calif. To solve the problem the assembler uses a reversible, variable speed air motor.

Axial-piston design in this air motor provides the instantaneous, positive starts and stops, yet regulation of exhaust air by the operator permits controlled braking action. Because no mechanical connections exist between the source of air and motor, burn-outs cannot occur, a feature that reduces maintenance costs. The five-piston air motor, a Keller Tool 70A-42 model, develops no sparks, operates efficiently at high or low air pressures, and delivers constant torque which can be varied through regulation of the air pressure.

At 90 psi. the motor produces 0.9 hp. Stall torque is 5 ft.-lb. with the maximum overhung load of 800 lb. Starting torque is 3.7 ft.-lb. At maximum output maximum air consumption is 40 cu. ft. of free air. The air motor weighs 14½ lb. and is 14 in. long.

. . . for more details, circle No. 57 ➔

ONE-INCH INVESTMENT CASTING TESTS 200,000 PSI

This latching "dog" had to meet a 6600 lb. pull test, and have a tensile strength of 180,000 to 200,000 PSI. Originally it was forged. Then it was flame cut from plate stock. Then stamped in two pieces from thin sheet stock. Each time machining or fabricating ran too much. Given to Bone, it was pressure cast as a finished part to the specified requirements. Inquiries are invited on intricate parts of difficult-to-machine metals.

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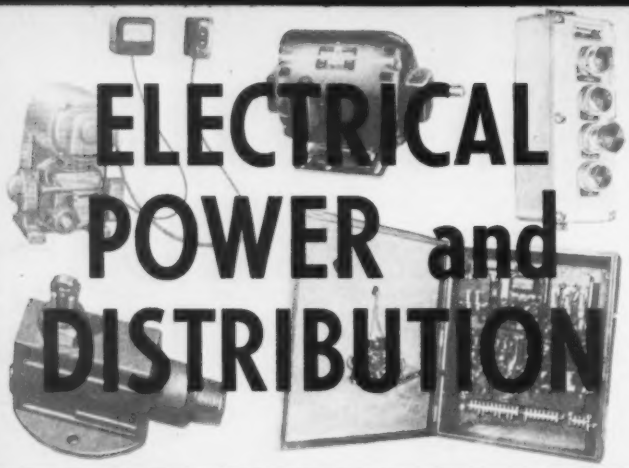


ELECTRICAL POWER and DISTRIBUTION

How Western manufacturers have used motors and controls, fuses, cable, rectifiers, etc., to effect cost savings and speed production

Ganged feed regulator controls reduce waste of raw materials

case history 52

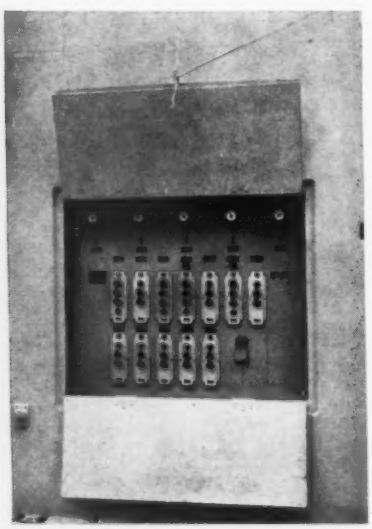
Controls for five Jeffrey vibrating feeders have been designed right into the central operator's panel at the city of San Francisco's municipal asphalt plant. A reduction in wasted material and increased ease of operation have resulted from the centralized controls.

In this operation five streams of sand and aggregates are fed onto a conveyor belt which brings raw materials to the hot plant. Because of the fast response of the feeders and the convenient grouping of the controls, any variation in raw materials feed due to segregation in the bins or other causes can be corrected at once. This is important because the mix is screened later in the process and any fraction of the feed which is out of its proper proportion is rejected and diverted to a waste truck.

If conventional individual feeder controls had been used on the raw material bins, time required for adjustment of proportions would have been much longer than that required by the consolidated panel in use. Five sets of Jeffrey rectifier and control components were ganged under the direction of General Conveyor, Inc., San Francisco engineering representatives for Jeffrey. The simple circuitry and small number of components in the vibrating feeder apparatus made it easy to adapt them to the desired special control arrangement. In addition, controls for 12 other machines in the plant were built into the centrally located panel as required by city design engineers.

The completed panel presents a weather-tight face to an opening in the building wall. Rear access to the panel is from within the building through items of standard NEMA 1 construction. Further protection to the front of the panel is afforded by a hinged weather-tight door, shown in the accompanying photo in open position.

When these hoppers feeding various raw materials to an asphalt plant are out of adjustment, raw materials are wasted.



To quickly effect adjustment of hoppers, pictured left, controls for each were ganged into one centralized panel.

New fuse permits use of lower amp.-rated main switch

case history 53

While planning the wiring layout for Nehi Bottling Works in Boise, Ida., Alloway Electric Co. found that, to carry the load, the job would require a 400-amp., 250-v. main switch. When this was noticed in the estimate, operators of the bottling plant felt the cost of the heavy switch was too high.

Therefore, the Boise electrical contracting firm recomputed the job using Bussman Fusetron dual-element fuses. It was found that by using the dual-element fuses, a 200-amp., 250-v.

Installing new fuse which enabled him to lower the amp. requirement on this main switch is R. M. Alloway, Boise, Idaho.

switch could be used. This reduced the cost of the installation and resulted in better protection for the circuit.

Sealant that guards motors and circuits passes tough tests

case history 54

Four tough electrical maintenance jobs in the West have been used during the past 12 months for field testing of a new chemical insulation impregnator which reportedly lengthens motor and circuit life by 50% when failure is attributable to moisture and humidity.

Common denominators of the collective problems at the four locations were moisture, humidity, extreme changes of temperature, and other such external factors. Safe-T-Seal, the new chemical product being tested, was applied to fortify electrical elements against premature breakdowns. Reports on each of the four applications indicate extreme success and users expect better than twice its present life from electrical equipment involved.

An aerosol-type dispenser which provides an easy-to-use means of applying the new sealant to switchgear, housings, electrodes, insulators, and transformers was developed a year ago by Safe-T-Seal division, MB Aircraft Services of Burbank, Calif., marketers of the product. Its initial use was at Sun Garden Packing Co., San Jose, where steam and condensation fouled switch and fuse boxes located near a continuous cooker. When shutdowns became prohibitive, Rosendin Electric Co. of San Jose applied the sealant via an aerosol bomb and the problem was quickly solved.

At Long Beach, where moisture and salt spray were a constant factor, the Long Beach Neon Sign Co. was faced with a real troublemaker in one of its leased signs, a combination clock and temperature installation. A six-month check of maintenance records showed 13 failures and a service call cost of $104. All electrodes and housings as well as two transformers were sprayed with the aerosol bomb at a cost of approximately $1, and in the next six months no failure was reported.

Electrical motors throughout Coast Packing Co. plant in Los Angeles are subject to extreme moisture problems. One motor, used to operate the pork grinder, had an average life of less than two weeks due to the fact that cleanup operations call for water washdown at 180 deg. blasted out at 250 psi. The motor was rewound and processed with the sealant by Reed Electric Co., Los Angeles, and returned to the same spot. Ted Barrett, chief engineer at Coast, reports that the treated motor has not failed since.

Protected by a new chemical product, motors at Coast Packing in Los Angeles are washed down with 180-deg. water at 25 psi.

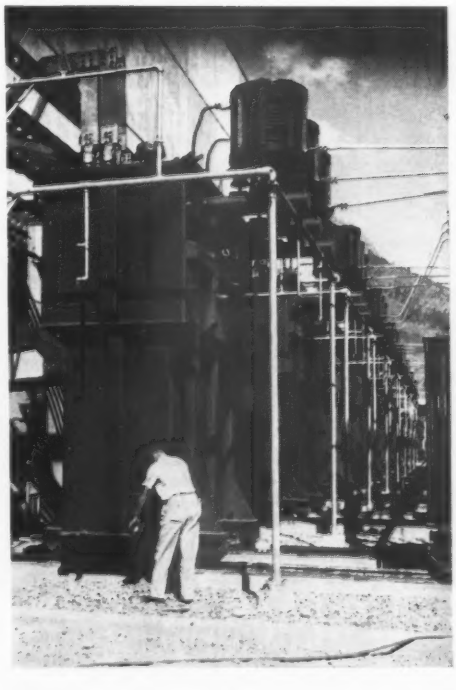
At Tecolote Tunnel, 6-mi. USBR tunnel now nearing completion near Santa Barbara, Chief Electrician Erwin Kubsch ordered every piece of electrical equipment to be sealed, from engine motors to mine phones. Larson-Hogue and Reed Electric made the installations when a 6,000,000-gal. daily flow of 120-deg. water turned the tunnel into a humid, watery grave for non-sealed equipment.

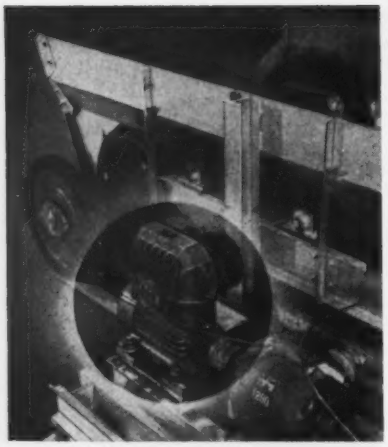
First aluminum pot line use of water-cooled transformers

case history 55

First Westinghouse water-cooled rectifier transformers ever used on an aluminum pot line are serving the Anaconda Aluminum Co.'s two new pot lines at Columbia Falls, Mont. Using the water-cooled units instead of the previously used self-cooled units, several operating advantages are gained: transformer floor area is reduced to less than half, weight is decreased by 35%, and first cost was less.

Sixteen rectifier transformers are used in this installation, eight for each of two 100,000-amp., 700-v. pot lines. Each 10,200-kva. transformer takes power at 13.8 kv. and feeds it into a 12,500-amp. Westinghouse ignitron rectifier unit at 700 v. The eight rectifiers in parallel supply the 100,000-amp. pot line.





190 ft., 60 in. belt-type log sorting conveyor

RADICON Speed Reducer

Keeps Logs From Sleeping in Paper Mill Wood Room

A modern paper mill depends on the log conveyor to feed the entire mill operation – continuously! The all-important speed reducer must be rugged, reliable and efficient.

That's why fan-cooled Radicons, like the model 10 RHU (ratio 60:1) in the above mill installation, are being specified. Using a 15 hp motor at 1,800 rpm, the Radicon output shaft delivers a powerful 29 rpm – at 80% efficiency.

Check the installation. It is a good example of the Radicon extra roller bearing amply accommodating a small diameter (10 in. P. D.) chain sprocket... greatly reducing the cost of chain drive.

The 10 RHU Radicon sells for $595.00 – immediate delivery. Packaged drives supplied by authorized David Brown factory branches and distributors:

Portland, Oregon: Zidell Machinery & Supply Co.
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DB(G)-2

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Gearmotor cuts equipment need in conveyor speed coordinating

case history 56

At Union Lumber Co., Ft. Bragg, Calif., a conveyor was installed to carry lumber scrap from the plant's trimmer to an outside scrap pile. In this case, the speed at which the conveyor moves had to be coordinated with the speed of several other conveyors, all of which form an integral part of the lumber trimming operation.

If the scrap conveyor were driven by a standard 1,800-rpm. motor, a cumbersome system of belt and pulleys or chains and sprockets would have been required in order to bring the speed of the conveyor down to the desired level. Therefore a General Electric Pacific gearmotor, pictured above, was installed to provide the drive. The gearmotor provides a compact, safe, and easily maintained drive. Future maintenance expenses for the gearmotor drive promise to be less than those for a standard speed motor equipped with a speed reduction system of pulleys, belts, sprockets, chains, and extra bearing supports.

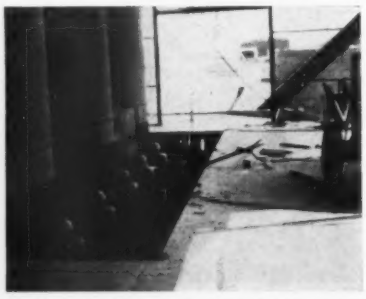
This compact gearmotor and chain drive power scrap conveyor at Union Lumber Co., Fort Bragg, Calif.

According to James Kennedy, chief engineer at Union Lumber, an application like this one requiring an exact reduced motor speed in his experience calls for gearmotors as the most efficient and economical drive.

Problem of feed mix variation beat by use of geared motors

case history 57

Variable consistency, obtained from variable speed adding of individual feeds, is the key to custom feed mixing. Thompson and Gill, Madera, Calif., manufacturer of agricultural machinery, has developed a continuously operating machine designed to provide the benefits of custom feed mixing to the small operator.



Double-reduction geared variable speed drives shown in pit above are the key to economical custom feed mixing.

For proper feeding of cattle, feed must be varied as to mixture to adjust for weather, size of animals, and seasons. Previous to development of this machine, benefits of custom mixing of feed were available only to larger feeding and marketing organizations.

Sterling Electric Motors Speed-Trols with double reduction gearing drive screw conveyors, through chain and sprocket, on each of several cylindrical bins. Grain in varying amounts is conveyed into a common conveyor from which comes the desired mixture of feed.

The positively controlled, variable pitch, pulley V-belt transmission which is mounted integrally with reduction gears in the Speed-Trol permits any speed to be accurately maintained

once set, regardless of load variations. Thus, settings of screw conveyor speeds on each bin can produce any desired mixture of raw feeds.

Charts have been calibrated for each bin which indicate required speed settings to obtain a given number of pounds of feed per minute. Once the separate feeds have been mixed in the common conveyor, the resultant fodder is raised to an elevated storage bin by a series of conveyors powered by Sterling Slo-Speed gearmotors. Trucks are loaded directly from the elevated bin and deliver feed to the range or feeding pens.

Connecting lines to heavy equipment at National Supply Co., Torrance, Calif., are 500,000 CM-single conductor, 600-v. aluminum Cdr. cable connected to bus.

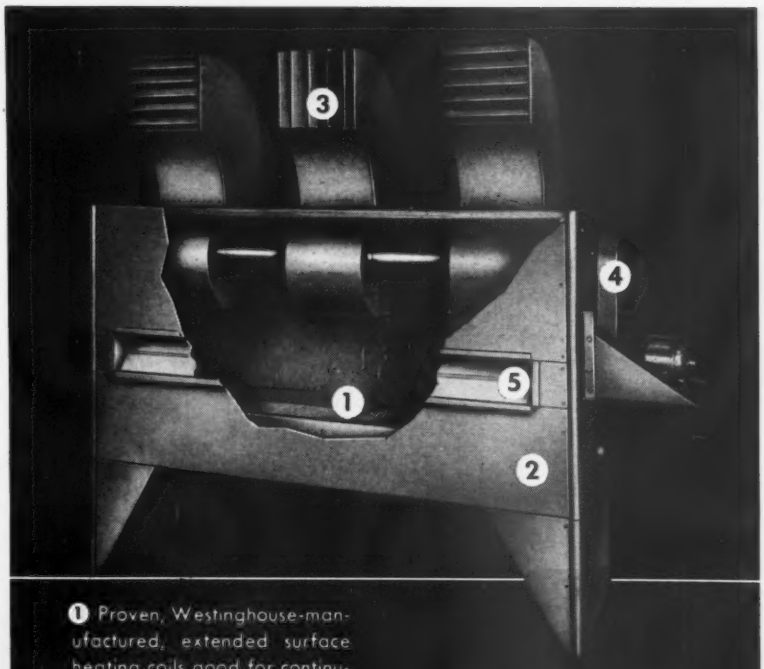
Aluminum conductor cable saves money for heavy loads

case history 58

National Supply Co., Torrance, Calif., attributed definite money savings in their heavy equipment operation to use of 500,000 CM-single conductor, 600-v., type RH—aluminum Cdr. cable. A United States Rubber Co. product, 8,000 ft. of the cable has been used for connecting lines to large equipment.

Connected to bus, the cables carry current to distribution panels for such heavy loads as welding machine shears, rolls, etc.

Can you use more information about operations described in this issue? Write: Editor, Western Industry 609 Mission St., San Francisco 5.



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❺ Face and by-pass dampers permit continuous air circulation to maintain uniform temperatures.

NOTE: Louver-type mixing box accessory permits introduction of fresh air for make-up and ventilation, with or without filters.

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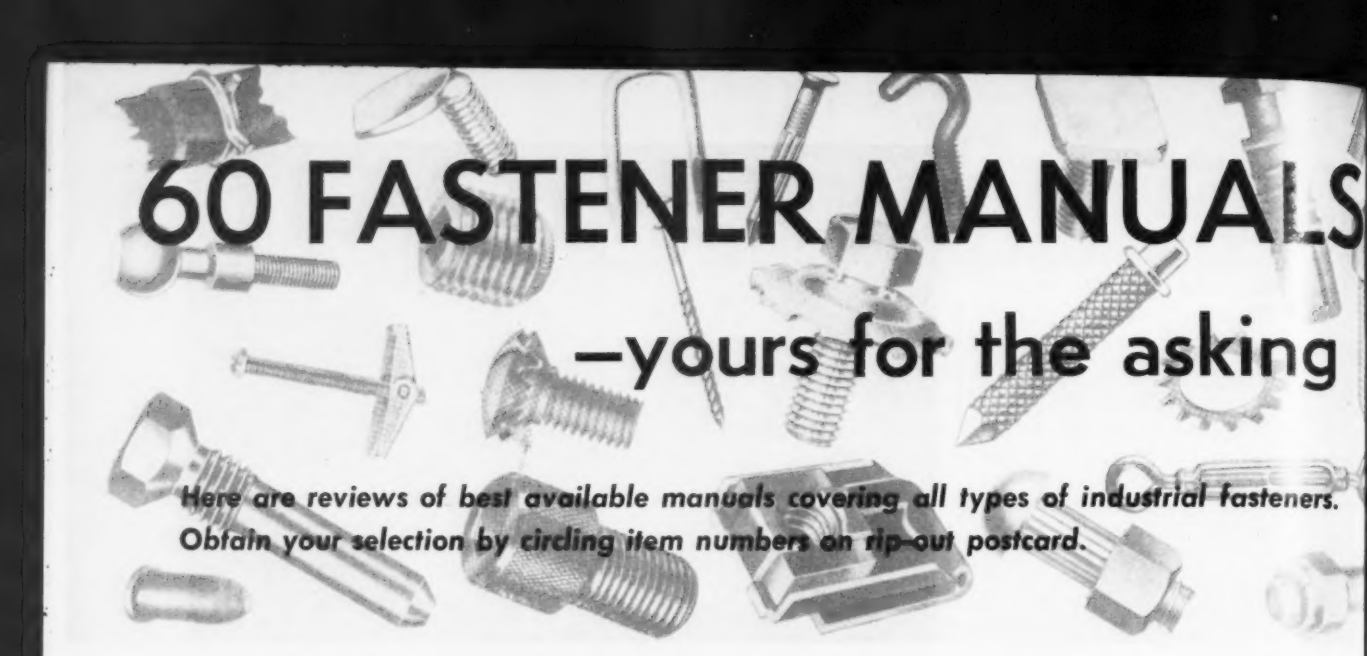

60 FASTENER MANUALS —yours for the asking

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Collected over the past three months by the editors of WESTERN INDUSTRY as a special service to readers, the manuals are offered free of charge to key production and plant operating men in Western manufacturing plants. You are invited to check this listing quickly and select those manuals that promise to be most helpful with your fastener problems. Circle appropriate key numbers on this month's Reader Service Postcard (page 89), and we will be glad to see that you obtain your selection promptly and without obligation.

143-page handbook on Bethlehem Pacific bolts, nuts, rivets, spikes, washers, and specialties

All types of fasteners supplied by Bethlehem are pictured, described, and detailed in this complete manual. Includes info on both standard and special products. General engineering information provided in introduction. Price tables included. Catalog 295. *Bethlehem Pacific Coast Steel Corp.*

. . . for your copy circle No. 150

46-page handbook on Tinnerman Speed Nut fasteners

First section of this book (No. 306) provides general information on development of Speed Nut brand fasteners, basic specifications, and details on these fast, secure, vibration-proof attachments. Remaining pages give brief descriptions of basic types of Tinnerman fasteners and how they are applied, suggesting many uses in product assembly. *Tinnerman Products, Inc.*

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Booklet on lockbolts, new special fastener

Eight-page brochure gives production and structural advantages of Townsend lockbolts, shows how they work in a series of engineering drawings, tabulates dimensions and specifications, and recommends application and installation procedures. Instructions on how to order Townsend lockbolts complete bulletin. *Townsend Co.*

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28-page handbook on Allen hex-socket screws

Complete line of Allen hex-socket screws—set, cap, shoulder, dowel, etc., and keys—pictured and detailed, with prices indicated. Information included on how and where to use. Concludes with key fit table. *Allen Mfg. Co.*

. . . for your copy circle No. 153

CF&I screw and ring shank nails

Designed for use where increased holding power is desired, these special nails for all types of woodworking are pictured and detailed in Bulletin WFR-263. *Colorado Fuel & Iron Corp.*

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52-page data book on stainless fasteners

Comprehensive thumb-indexed volume provides illustrations, thread and size specs, and availability of 40 basic stainless fastening devices (screws, bolts, nuts, washers, rivets, etc.) Second half of book supplies engineering data on composition, properties, applications, weights of stainless steels, and other tables. *Allmetal Screw Products Co.*

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Self-locking inserts for lightweight metal applications

One-piece, self-retaining, self-locking bushing designed for applications in aluminum alloy, magnesium and mild steel castings are pictured and completely detailed in 6-page bulletin 5513. Instructions are provided for use in product design, production and maintenance. *Elastic Stop Nut Corp. of America.*

. . . for your copy circle No. 156

Application data on lock-type nuts and screws

Folder explains locking action of Spin-Lock nuts, gives sizes and dimensions, compares torque of this type of nut with standard machine screw nuts. Last page tells about Spin-Lock action in screws. *Russell, Burdsall & Ward Bolt & Nut Co.*

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20 pages of data on hex socket screws

Complete line of Bristol hex socket screws are pictured, described, and detailed—set, cap, flat head cap and shoulder screws, pipe plugs and keys. Information on special designs included in Bulletin 898. *The Bristol Co.*

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14-page booklet on anti-vibration self-locking nuts

Elastic Stop Nuts, fasteners designed to resist the loosening effects of vibration and impact, are described in their many thousands of sizes and varied configurations in Bulletin 5512. Selection suggestions and application principles are given. *Elastic Stop Nut Corp. of America.*

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130-page handbook on all types of fasteners by Pheoll

Pheoll Catalog 55 covers company's line of screws, bolts, and nuts. Additional sections cover special products designed and manufactured for individual assembly problems; plating and finishing services; screw thread dimensional limits (in tabular form); and general information on steel, gages, discount tables. *Pheoll Manufacturing Co.*

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72-page pocket manual on nails, brads and staples

Complete CF&I line of nails, brads, spikes, and staples in both stock and non-stock sizes, finishes and types are described in firm's booklet WFR-267. Every characteristic of each type of CF&I nail—hardness, finish, size and type of head and points, etc.—is detailed. Many illustrations. *Colorado Fuel & Iron Corp.*

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Condensed data on cold-headed parts

Catalog 58 contains a great deal of general information on cold forging for specific uses, covering fluting and knurling features on fasteners to solve particular problems. Other sections discuss "uncommon" nails, special rivets, screws, secondary operations such as rebeading, special threading, slotting, painting, turning, swaging, tapping, and drilling, and metals. *John Hassall, Inc.*

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Data sheets on Bristol socket screw characteristics

Series of sheets list ultimate tensile strengths, elongation, reduction in area and Rockwell hardness of material, and minimum breaking strength of all standard size Bristol socket screws. Sheets covering screw finishes included. Punched for binder filing. *The Bristol Co.*

. . . for your copy circle No. 163

12-page handbook on high-strength bolting

Headings on various sections of this comprehensive bulletin are titled: theory, advantages, bolting procedure, comparative tests, bolted vs. riveted joints, examples of various types of loading, and mechanical properties and specifications. *Russell, Burdsall & Ward Bolt and Nut Co.*

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Clecap socket head screws, small and large size

All types of Clecap socket cap screws are described. Features of the screws, including 1⅛ in. and larger sizes, are given. *Cleveland Cap Screw Co.*

. . . for your copy circle No. 165

Arro fastening and drilling devices for masonry

Catalog 68, in 32 pages, illustrates, describes, and provides complete dimensional information on expansion anchors, toggle bolts, carbide drills, star drills, bull points, and turnbuckles for making fastenings to masonry. *Arro Expansion Bolt Co.*

. . . for your copy circle No. 166

Specs on Allen hex-socket screws and pipe plugs

Detailed tables cover screw sizes, body lengths, types of threads, strength and hardness characteristics, etc. Includes recommended applications. *Allen Mfg. Co.*

. . . for your copy circle No. 167

Special forged fasteners for quantity runs

Cleveland tells in this bulletin 6-step Kaufman Double Extrusion procedure and facilities for upset and extrusion manufacturing of quantity-run special fasteners. Many illustrations. *Cleveland Cap Screw Co.*

. . . for your copy circle No. 168

Threaded nails that lock with wood fiber

Each of 58 types of threaded nails are illustrated and described in Stronghold Line catalog F-1070. Reasons for greater holding power after driving are given with specs. *Independent Nail & Packing Co.*

. . . for your copy circle No. 169

Engineering bulletin on nuts, washers, and tools

Bulletin 508 gives specifications for Ace Kwik-Nuts and Ace torque washers. Second page covers Ace fastener tools. *Frank L. Robinson Co.*

. . . for your copy circle No. 170

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The Ridge Tool Company, Elyria, Ohio, U.S.A.

. . . For more details, circle No. 60 on Reader Service Postcard

Bulletin on screws that lock into place

Spin-Lock screws are the subject of this 8-page well-illustrated booklet, which explores—with diagrams—this principle of fastening, lists its advantages and features, and gives design data, with dimension tables on hex head, pan head, truss head, flat head, and large flat head screws. *Russell, Burdsall & Ward Bolt and Nut Co.*

. . . for your copy circle No. 171

Fastener with metal head and neoprene washer

Tuff-Tite fasteners, with pre-assembled neoprene washers, are effectively described in this folder, which shows in pictures why they can give a watertight and airtight seal as well as their other special features. Dimension tables are included for standard head styles. *Townsend Co.*

. . . for your copy circle No. 172

Complete specs on Tinnerman spring tension fasteners

Major types of Speed Nut brand fasteners (over 8,000 variations have been developed by this company) are described in 12-page Bulletin 333-1. Principle of Speed Nut design is covered in introductory paragraphs, as well as advantages of this one-piece, vibration-proof fastener. Technical data on products includes engineering sketches and dimension tables. *Tinnerman Products, Inc.*

. . . for your copy circle No. 173

Application data and specs on socket screws

Folder from Standard Pressed Steel Co. lists company's line of Unbrako socket screw products, Flexloc self-locking nuts, Hallowell steel collars, and Sel-Lok spring pins, giving useful data and specifications. *Standard Pressed Steel Co.*

. . . for your copy circle No. 174

Data on Ramset power-actuated fastening system

Bulletin 2f/Ram (AIA File 17F) explains the Ramset fastening system and the equipment it uses: tool, power charge, and fastener. Remaining five pages of this 8-page brochure contain dimensioned pictures of Ramset studs and pins and photographs of some Ramset stock guards. *Ramset Division, Olin Mathieson Chemical Corp.*

. . . for your copy circle No. 175

Styles and applications for pressure sealing zippers

Photographs and engineering drawings show this new kind of seal that shuts out liquids, gas, dirt, and zips open and closed in seconds. Text explains the advantages in design, styling, and maintenance, as well as giving installation, operation, and storage procedures. *B. F. Goodrich Co.*

. . . for your copy circle No. 176

Operation and applications of stud welding

Nelweld stud welding is covered by this 4-page folder (G-1). Process is shown in sequence drawings, and applications are suggested by series of photographs. *Nelson Stud Welding, division of Gregory Industries, Inc.*

. . . for your copy circle No. 177

Specs on Aero self-sealing flat head screws

Dimensional tables on Absco self-sealing screws are included in data sheet AB9. This 100-deg. flat head screw is fully diagrammed with property tables, as well as information on the Teflon shim washer and O-ring sealer which seal mating surface to fastener head. *Aero Bolt & Screw Co., Inc.*

. . . for your copy circle No. 178

Folder on wood screws treated for easy driving

Elco Speed-ized wood screws are described in economical style in this brief folder. Advantages of this treatment—an invisible coating of lubricant placed on screws before final inspection—are covered under nine headings. *Elco Tool and Screw Corp.*

. . . for your copy circle No. 179

Place bolts—how and why to use them

Advantages and locking features of place bolts are detailed. Data on tensions and elongation due to elasticity of steel listed, with description of functioning. *Cleveland Cap Screw Co.*

. . . for your copy circle No. 180

Slide-rule for rivet selection

Here is a convenient pocket-size guide to the recommended rivets for a wide range of size requirements. *Milford Rivet & Machine Co.*

. . . for your copy circle No. 181

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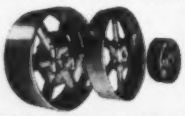

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. . . for more details, circle No. 61 on Reader Service Postcard

Comprehensive reference book on cold heading

Handsome 36-page spiral-bound Catalog 65 is a veritable reference book of useful information on cold heading. Sub-sections break text into following discussions: special nails, special rivets, special screws, and miscellaneous operations. Excellent product illustration. *John Hassall, Inc.*

. . . for your copy circle No. 182

Design data folder on cold formed fasteners

This series of data sheets contains information on how to solve fastening problems by making use of cold formed parts. This series is kept up to date by periodical mailings containing information on new developments, solutions to problems, and changing design methods. *Townsend Co.*

. . . for your copy circle No. 183

New technique in forming special fasteners

Eight-page bulletin 600-A presents Camcar Cold-Flow technique, a new metal forming process for producing special parts and fasteners while retaining natural grain structure of material. Photographs back up text and show company's facilities in action. Standard parts are also available for immediate shipment. *Camcar Screw & Mfg. Co., division of Textron American, Inc.*

. . . for your copy circle No. 184

High-torque self-locking socket set screws

This 12-page bulletin goes into considerable detail on Unbrako line of self-locking socket set screws. Dimension tables, drawings, descriptive text are given for each of several types of these screws, and socket screw keys are also shown and described. *Unbrako Socket Screw Division, Standard Pressed Steel Co.*

. . . for your copy circle No. 185

Specs on Aero self-sealing screw-washer head screws

Data sheet AB 25 gives full drawing and dimensional tables on Absco self-sealing screw-washer head screws. Tables on shim washer and O-ring are included. *Aero Bolt & Screw Co., Inc.*

. . . for your copy circle No. 186

Data on weld nut, for application by resistance welding

An informative, well-illustrated folder on Ohio PN weld nut. Drawings show top, bottom, and sectional view, as well as manner of assembly. Other information covers design, production, applications, and dimensions. Bulletin 551. *Ohio Nut & Bolt Co.*

. . . for your copy circle No. 187

Details on Bristol Multiple-Spline socket screws

Bristol's Multiple-Spline design for socket set and cap screws is completely described in 20-page Bulletin 899, with reasons why socket will not round out or socket wall break. Complete specifications. *The Bristol Co.*

. . . for your copy circle No. 188

Data book on one-piece blind rivet with internal threads

This bulletin has 14 pages of information on Goodrich Rivnuts—typical applications, Rivnut types, preparation, tool adjustment, tools, and Rivnut specifications and engineering and how-to-order data. *B. F. Goodrich Co.*

. . . for your copy circle No. 189

Special threaded nails for pallet making

Bulletin 5-253 describes screw features of Screw-Tite and Stronghold nails for use in pallet manufacturing, claimed to double or triple pallet life. *Independent Nail & Packing Co.*

. . . for your copy circle No. 190

No decarburized surfaces on Chicago fasteners

Special heat treating process taking place in carbon restoring atmosphere provides screws high in tensile strength and torquing value, according to Chicago Screw, and two folders and discussion pamphlet by the firm's chief metallurgist are available to give you the story. Specs are given for the firm's broad line of cap screws. *Chicago Screw Co.*

. . . for your copy circle No. 191

Examples of cold heading for special parts

Folder shows 17 special fasteners manufactured by Elco using cold heading method, with brief text on method's cost advantages. *Elco Tool and Screw Corp.*

. . . for your copy circle No. 192

President J. Louden, (Right) of Consolidated Nurseries, and Vice Pres. F. Teddar, driving 4-passenger TAYLORCAR Model P-3 Personnel Carrier, used for inter-plant liaison and customer tours of their plant.

Consolidated Nurseries Eliminate 12 Handling Operations with . . .

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Now handle over 1,000,000 units monthly with efficient TAYLORTRUCKS & trailers!

Consolidated Nurseries cut material handling in their sprawling Tyler, Texas, plant from *16 operations to only 4* with TAYLORTRUCKS and Trailers! In addition to *time and labor savings*, the lowered handling reduced scratching and bruising and has resulted in a *higher quality product.*

Consolidated uses seven Model A-3 TAYLORTRUCKS, each pulling a train of 4 to 6 trailers. Each trailer handles 400 rose bushes. The bushes are hauled by TAYLORTRUCK from receiving stations to the cold storage warehouse.

During the December to February selling season, the stock flow reverses. The bushes are taken by TAYLORTRUCK trains from cold storage to 12 packing stations where they are prepared for shipment.

TAYLORTRUCK gives more *efficient, economical* and *dependable* materials handling to many plants and warehouses. It combines *low initial cost* and *low maintenance* cost with years of trouble-free service.

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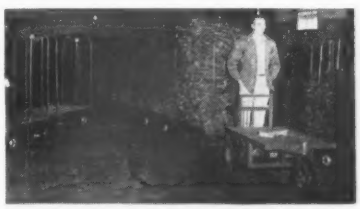

Rose bushes are hauled in TAYLORTRUCK trains from receiving sheds to cold storage.

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Complete specs on Ohio fastener line

This well-organized and thorough 32-page bulletin (Catalog 55) details Ohio products, discusses advantages of this line of weld fasteners, and gives customer information on ordering. Good illustration with both drawings and photographs. Major sectional headings are: adjusting nuts, adjusting screws, brackets, custom parts, handles, knobs, nuts, pads, pins, and screws. *Ohio Nut & Bolt Co.*

. . . for your copy circle No. 193

9,000 items in this 66-page catalog

First edition of a new semi-annual catalog combines stock lists, price lists, and discount sheets in one publication. All pertinent data on each item is printed on one line, including net prices in various quantity brackets. Manual includes index (illustrated with drawings of various products) and listing of over 9,000 items and sizes in different stainless analyses. *Anti-Corrosive Metal Products*

. . . for your copy circle No. 194

Data on seals and sealing methods

A 4-page bulletin carries a brief discussion of this company's sealing methods, available in fluid fitting seals, orifice seals, closure seals, fastener seals, O-rings, and electrofluid seals. Data sheets on company products cover: (1) RivOSeal (sealed flush rivet), (2) CaskOSeal (precision rivet and bolt seal, for close fitting holes only), (3) StatOSeal (for universal fittings), (4) LockOSeal (bolt or stud seal), (5) BoltOSeal (sealed flush bolt). *Franklin C. Wolfe Co., Inc.*

. . . for your copy circle No. 195

Snap rings, spring lock washers and Eaton Springtites

Complete line of Eaton's Reliance Div. is covered in 24-page manual 4k-3—snap, bearing, lock or retainer rings for any type of ring fastening application; and spring lock washers that make sure bolts and screws can not come off. Many types of applications are pictured, along with complete specs and prices. *Reliance Div., Eaton Mfg. Co.*

. . . for your copy circle No. 196

How to design for stud welding method

Here is a 10-page manual (Form D-2) on Nelweld process, directed to the design engineer. Subjects covered include stud specifications, stud locating methods, dimensions of counterbore and countersink, physical properties, limiting dimensions, and other useful information. *Nelson Stud Welding, division of Gregory Industries, Inc.*

. . . for your copy circle No. 197

Screw and lock washer assemblies for saving time

Folder tells why pre-assembled screw and lock washers save time in production and lists secondary advantages such as simplification of purchasing, saving space, adaptability to automatic feed. Styles of fasteners and washers are listed, as well as variety of materials from which they can be made. *National Screw & Mfg. Co.*

. . . for your copy circle No. 198

Booklet offers solutions to fastening problems

Twelve-page bulletin gives Nutt-Shel company history as an introduction to product descriptions and recommendations. Some of these are self-locking anchor nut, self-sealing dome nut, one-lug anchor nut, and external wrenching nut retainer. Includes form to state your fastening problem which company will help solve. *Nutt-Shel Co.*

. . . for your copy circle No. 199

High-strength bolting for structural joints

18-page booklet 375 gives the complete story on high-strength bolts—what they are, advantages, strengths, assembly details, results of tension, hardness and other tests. Photos show installation details. How-to-order information included. *Bethlehem Pacific Coast Steel Corp.*

. . . for your copy circle No. 200

Self-sealing bolt-hex head screws

Specifications on alloys and steels used are included in data sheet AB 15 on Bolt-Hex head Absco self-sealing screws. Dimensional tables and detail drawing, as well as other properties of screws are given. *Aero Bolt & Screw Co., Inc.*

. . . for your copy circle No. 201

Twinfast screws with recessed heads

Folder explains design improvements incorporated in Twinfast thread, which permits faster driving with less splitting and greater holding power. Table of drill and bit sizes for proper shank clearance concludes bulletin. *National Screw & Mfg. Co.*

. . . for your copy circle No. 202

Fastening techniques for small assemblies

An attractive 16-page bulletin, with illustrations, contains the meat of a paper, "Fastening techniques for small assemblies," presented before the American Society of Tool Engineers. Discussion of riveting principle for fastening is followed by an outline of the five types of small rivets, their design requirements, application, and method of production. *Milford Rivet & Machine Co.*

. . . for your copy circle No. 203

Specialty fasteners available from Bethlehem

All types of forged, upset, punched, rolled, drawn, formed, headed or threaded steel specialty products available from Bethlehem Pacific bolt and nut plants on Pacific Coast are pictured and described in Folder 586. *Bethlehem Pacific Coast Steel Corp.*

. . . for your copy circle No. 204

Pre-assembled washer-screw units for faster production

Standard and special-feature SEMS, pre-assembled units in which washer is held on screw by rolled thread, are dramatically presented in this 30-page spiral-bound booklet. Its message is that SEMS are available in wide range of types and sizes to meet almost every application requirement. Assembly advantages are explored. *Pheoll Manufacturing Co.*

. . . for your copy circle No. 205

Selecting and applying cold-formed rivets

This 12-page bulletin (No. 240) has a useful discussion of the cold forming process; how to select proper rivet for a specific material and application; case histories showing typical applications; specifications; and engineering data on special rivets, supplemented by drawings. *Milford Rivet & Machine Co.*

. . . for your copy circle No. 206

16-page handbook on special products service

Twelve actual examples of special fasteners and parts produced more economically by this company, using cold heading, than by previous method of manufacture, are carried in this pocket-sized bulletin. In addition, general information covers welding fasteners and adjusting or leveling screws. *National Screw & Mfg. Co. of Calif.*

. . . for your copy circle No. 207

Fasteners for joining steel, sheet metal, wood, plastic

Folder gives a quick introduction to Pheoll products, including Phillips recessed head screws and bolts and Sems single screw and washer units. *Pheoll Manufacturing Co.*

. . . for your copy circle No. 208

Stud welding process for ferrous, non-ferrous metals

Bulletin contains reprint of article on stud welding for ferrous and non-ferrous metals, which appeared in *Product Engineering 1955 Annual Handbook*. Well illustrated. *Nelson Stud Welding, division of Gregory Industries, Inc.*

. . . for your copy circle No. 209

Catalog on projection welding fasteners

Standard and special projection-type weld screws and weld nuts are covered by this 8-page bulletin. Dimension tables cover welding screws of ten different types, welding pins and nuts, flanged weld nuts, and projection weldnuts. *National Screw & Mfg. Co.*

. . . for your copy circle No. 210

Recessed head screws and bolts recommended

Advantages of Pheoll fastenings with Phillips recessed heads are set forth in this illustrated folder, which describes the full range of styles and sizes of screws and bolts offered with this feature. *Pheoll Manufacturing Co.*

. . . for your copy circle No. 211

Condensed catalog on screws, bolts, and specials

Folder pictures and describes principal types of fasteners made by Elco, which range from drive screws, tapping screws, stove bolts, through thread-cutting screws and screw-and-washer combinations. *Elco Tool and Screw Corp.*

. . . for your copy circle No. 212

Dual tool for power-actuated fastening

New Ramset Duo-Jobmaster, two tools in one, is described in this broadside. Photographs show new interchangeable barrels and method of switching them. Brief text tells conveniences of new system. *Ramset Division, Olin Mathieson Chemical Corp.*

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70-page manual on worm reducers

Entire Radicon line of worm reducers is described by David Brown Corp. in its new 70-page manual. Operating characteristics and capacities are given as well as cutaway views of each unit. One chart illustrates efficiency of units in varying ratios as determined by gear centers and worm speed in rpm. Detailed selection data and information explaining available choices of bearing mountings and location within the units is also given. Last sections are devoted to application and maintenance data. *David Brown (Canada) Limited, U.S.A. Pacific Branch*

. . . for your copy circle No. 214

21 applications of electro-magnetic drives

This application analysis report pictures and describes 21 ways in which standard Warner units can be applied to power transmission drives. They include a mobile power unit, cylindrical grinder, engine lathe, index table, brush machine, boring machine, flash welder, paper cutter, as well as other industrial applications. Engineering and installation data on Warner electric brakes and clutches are also covered. *Warner Electric Brake & Clutch Co.*

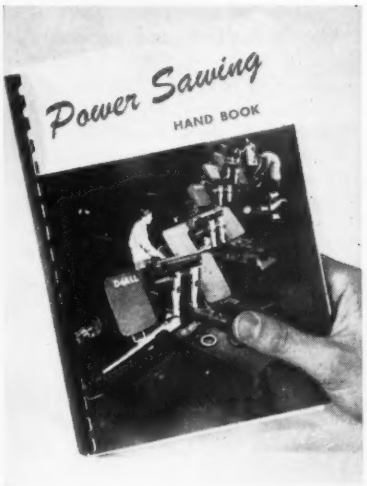
. . . for your copy circle No. 215

Application data on tubular products

New folder (TB-408) lists types of tubing produced by Tubular Products division of Babcock & Wilcox, giving chemical, physical, and mechanical properties and creep strength of most popular grades of B&W tubing steels. A special feature of this bulletin is that it gives references to company's technical literature on each type of tubular product for engineers and designers who are interested in detailed information. *Babcock & Wilcox*

. . . for your copy circle No. 216

108-page handbook on cut-off techniques



New pocket-sized DoAll "Power Sawing Handbook" concentrates solely on cut-off techniques, summarizing existing cut-off methods and providing special information on costs. A number of typical cost studies point up importance and methods of analyzing total cost per cut. One chapter discusses significance and the details of high-speed steel in its new form as a flexible saw band. Portion of book contains educational and informative discussion of the characteristics of commercial steels and provides recommendations for cutting each type of metal. *The DoAll Co.*

. . . for your copy circle No. 217

Oils for metal cutting operations

New Richfield 6-page bulletin fully describes six major groups of cutting oil line for lubrication and cooling during boring, broaching, drilling, grinding, hobbing, honing, milling, planing, shaping, tapping, threading, and turning operations. Selection chart indicates correct oils for use on each metal type in each operation. Machinability ratings of various ferrous and nonferrous metals are also listed. *Richfield Oil Corp.*

. . . for your copy circle No. 218

Complete listing of Harvey wrought aluminum products

Range of Harvey Aluminum's wrought aluminum mill products is shown in this 8-page booklet, which also provides general information for engineers and designers on standard tolerances, properties, and typical uses of various aluminum alloys. Text and illustrations describe extruded shapes, structurals, machining stock, drawn tube, forging stock, press forgings, impact extrusions, screw machine products, and heavy press extrusions. *Harvey Aluminum*

. . . for your copy circle No. 219

Complete guide to air compressors

Catalog 36 is a 44-page presentation of the ¼ through 20 hp. line of Brunner air compressors, featuring a detailed engineering section on selection and installation of correct equipment. Other sections describe and picture complete Brunner line, continuous operating outfits, accessories, and controls. *Brunner Manufacturing Co.*

. . . for your copy circle No. 220

IRA G. PERIN CO.
Material Handling Equipment
LOCAL STOCK & PARTS
SAN FRANCISCO 5
575 Howard Street
Phone GArfield 1-1827
SERVICE • • • SURVEYS

. . . for more details, circle No. 63 on Reader Service Postcard

Data book on industrial instruments

This 42-page catalog (C-12) gives brief descriptions of Meriam instruments—primary standards of measurement for indicating pressure or flow of liquids and gases. Among these are instruments in the manometer field, such as dual tube, multiple tube, and pressurized systems, and packaged test units for use in aircraft and industrial calibration and test work. Photographs and price lists. *Meriam Instrument Co.*

. . . for your copy circle No. 221

How to move materials with Mobilift fork trucks

New 6-page bulletin gives busy reader a fast-moving over-all view of Lamson Mobilift fork lift trucks, and 12 matched attachments. Single table gives varying operating characteristics of 10 different models. *Lamson Mobilift Corp.*

. . . for your copy circle No. 222

Metal powder data sheet

Data Sheet No. 4, "Standards, specifications and references for metal powders and metal powder products," indexes and correlates all commercially available standards, specifications, and references on these products (i.e., those issued by Society for Testing Materials, Metal Powder Assoc., Society of Automotive Engineers, and federal agencies). Directions are given for obtaining copies of these standards and specifications. *Metal Powder Assoc.*

. . . for your copy circle No. 223

44-page manual on variable speed drives

Catalog M-521 lists operating data, specifications, selection data, and prices of the Reeves line of variable speed drives. Included are descriptions and illustrations of modified models of the Motodrive and accessory items such as electric remote controls, manual controls, extended handwheels, handwheel speed indicators, automatic controls, tachometers, magnetic brakes, etc. Last six pages are devoted to engineering and application data. *Reeves Pulley Co.*

. . . for your copy circle No. 224

Arizona economic data

The 1955 edition of this report, compiled by Valley National Bank of Phoenix, carries over 50 statistical tables giving economic data for Arizona. The only text is the interpretive heading on some of the tables: i.e., "Arizona leads nation in farm income growth," "Arizona first in growth of manufacturing employment," "Ranks third in growth of motor vehicle registrations." Population figures, wages and employment, construction growth, school attendance, motor vehicle data, climate comparisons are among the subjects covered. *Valley National Bank of Phoenix*

. . . for your copy circle No. 225

How to pick the right fork truck

Here is the first of a new series of "fact folders" published by Towmotor to help manufacturers pick the right materials handling equipment for their own operations. This one covers Towmotor 500 Series, a compact 5,000-lb. capacity fork lift truck, gasoline, LP-gas, or diesel fueled. Specifications and operating data are given, with schematic drawings and graphs. *Towmotor Corp.*

. . . for your copy circle No. 226

JOY MANUFACTURING COMPANY, OLIVER BLDG., PITTSBURGH 22, PA.
IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

. . . for more details, circle No. 64 on Reader Service Postcard

2 REASONS
TRIPL-PALM
COATED
WORK GLOVES
CUT GLOVE COSTS
TRIPL-PALM design eliminates the "failure points" of ordinary work gloves, resulting in multiplied glove life . . . greatly reduced glove costs.
Knit-wrist or gauntlet style with coated or "free-breathing" backs. Ask your jobber or write for information.
THE SURETY RUBBER CO.
Carrollton, Ohio
EXTRA-HEAVY COATING FOR EXTRA LONG WEAR . . . and greater palm comfort.
NO SEAM HERE TO RIP OUT . . . Wing thumb (one-piece palm and thumb) construction for multiplied service life.
Dept. A
Western Division, 544 Market Street, San Francisco 4, California

. . . for more details, circle No. 65 on Reader Service Postcard

Introducing a silent screwdriver and nutsetter

This catalog sheet gives general and technical information on Thor Silent-air No. 2 series of screwdrivers and nutsetters, incorporating a new type of exhaust muffler. Directions are given for ordering this special feature on new tools or tools now in service. *Thor Power Tool Co.*

. . . for your copy circle No. 227

Industrial truck selection

New folder issued by Elwell-Parker gives key points in picking an industrial truck, such as: capacity, lift, total weight and size, battery capacity, mechanical features, and location of operator and truck controls. Convenient table lists 22 guides to evaluating type of truck most suited to a given operation. *Elwell-Parker Electric Co.*

. . . for your copy circle No. 228

Multiple-torch gas cutting machine described

This 12-page booklet (Catalog 804B) covers Oxygraph gas cutting machine in detail, showing it at work and listing its special features for precision cutting. Electronic tracer, used with 6B Oxygraph, is also pictured and described. *Air Reduction Pacific Co.*

. . . for your copy circle No. 229

New barrel-type boiler feed pump

Design features and principal advantages of Allis-Chalmers barrel-type boiler feed pump are described in new 16-page bulletin, which is generously illustrated with schematic drawings and photographs of maintenance procedures. Eight application photos. *Allis-Chalmers Mfg. Co.*

. . . for your copy circle No. 230

Centrifugal oil reclaimer

Here is a description of the new De Laval Puri-Filter pointing out the advantages in restoring used lubricating oil to like-new condition. Illustrated with photos and diagrams, four-page bulletin is addressed to users of turbine lubricating oil, diesel fuel oil, and heavy fuel oil. *De Laval Separator Co.*

. . . for your copy circle No. 231

New heavy-duty control relay

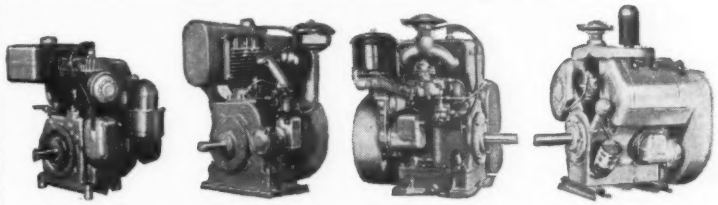
An 8-page bulletin (No. PL 7305-PM) describes this new line of sectional-pole heavy-duty 10-ampere control relays, available in models with from two to twelve poles, each of which is an independent unit. Bulletin pictures each of ten models in line. *Clark Controller Co.*

. . . for your copy circle No. 232

Most Specified as

STANDARD POWER COMPONENTS ON ORIGINAL EQUIPMENT . . .

WISCONSIN HEAVY-DUTY Air-Cooled ENGINES



Single Cylinder 3 to 8¼ hp. | Single Cylinder 6 to 9 hp. | Two-Cylinder 7 to 15 hp. | V-type 4-cyl. 15 to 26 hp.

IN THE FARM FIELD...

Specified by leading "blue chip" builders of farm and orchard equipment for: combines, pickup balers, forage harvesters, garden tractors, field crop and orchard sprayers, irrigation pumping units, portable elevators and many other machines.

Wisconsin-powered Model 87 New Holland Baler.

IN THE CONSTRUCTION FIELD...

Specified for leading makes of concrete mixers, concrete finishers, concrete cutters, power "wheelbarrows", hoists, bituminous spreaders, ditch diggers and trenchers, road rollers, conveyors, compressors, arc welders, pumping units, standby electric generators, etc.

Wisconsin-powered Smith DeLuxe Truck Mixer.

IN THE OIL FIELD...

Widely specified as integral power for many types of oil field utility units such as oil well pumps, gathering pumps, dope kettles, pipe straightening machines, compressors, salt water disposal pumps, trenchers, standby power units, etc.

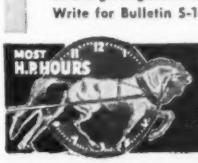
Wisconsin-powered Oil Field Booster Pump.

IN THE INDUSTRIAL FIELD...

Specified for plant floor sweepers and scrubbers; fork-lift, pallet and platform trucks; plant fire-fighting equipment; truck and trailer refrigeration systems; power lawn mowers and leaf sweepers and a great variety of specialized applications in many fields.

Wisconsin-powered Hyster Fork Lift Truck.

Because Wisconsin Heavy-Duty Air-Cooled Engines match the equipment of which they become integral units . . . because they fit both the machine and the job with maximum power advantage and minimum maintenance cost . . . these fine engines merit the serious consideration of design engineers and builders of equipment utilizing engine power within a 3 to 36 hp. range. Write for Bulletin S-179 and tell us about your power problem.



WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

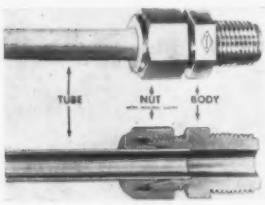
MILWAUKEE 46, WISCONSIN

. . . for more details, circle No. 66 on Reader Service Postcard

NEW EQUIPMENT for Western plant operation, production, and maintenance

USE RIP-OUT POSTCARD, page 89, for more information on products described.

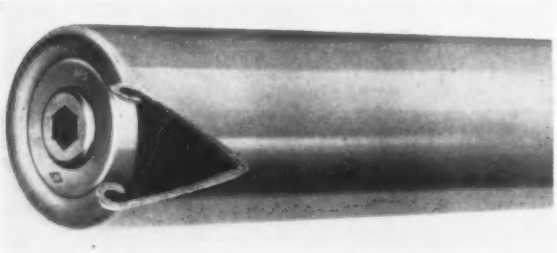
MOLDED NYLON TUBE FITTINGS
. . . are temperature and chemical resistant



Nylo-Seal tube fittings, suitable for use with either plastic or metal tubing, can provide savings up to 90% as compared with stainless steel fittings, states manufacturer. Molded from DuPont Zytel, they are impervious to most acids and alkalies and withstand temperatures from minus 70 to plus 250-deg. F. Nylo-Seal is a 2-piece fitting and requires no flaring of tube. Bulletin 3049 gives specifications. *Imperial Brass Mfg. Co.*

. . . for more details, circle No. 233 on postcard

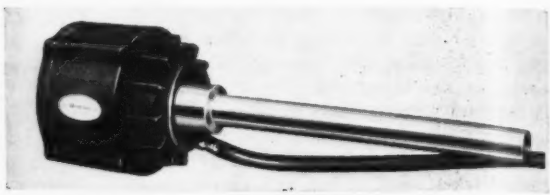
NEW-TYPE CONVEYOR ROLLER
. . . ends roller-caused damage and jamming



New integral end conveyor roller houses its bearings in ends which are rolled inward to give smoothly rounded end surfaces. Products move on and off conveyor lines without gouging by roller ends, and without jamming or tie-ups. Rolled design offers further advantage of extra strength at roller ends with no increase in weight. Available in two models: 2½-in. diam. 14 gage steel, and 2¼-in. 16 gage. *Alvey-Ferguson Co.*

. . . for more details, circle No. 234 on postcard

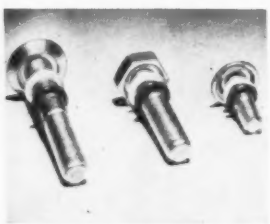
AIR-POWERED COLLET CLOSER
. . . pushbutton controlled or locked into machine cycle



Model BCC-60 automatic collet closer permits opening and closing collets on hollow spindle lathes and other rotating hollow spindle machines without stopping the machine. Holding pressures do not vary from piece to piece, and variations in stock size do not affect action. In many cases this may save a grinding operation. BCC-60, simple in construction, consists of a hollow draw bar mounted through center of an air cylinder. Draw bar is finished to accommodate type of collet desired and lathe or machine on which it is to be used. Collet closer may be pushbutton controlled by operator or interlocked with machine cycle for fully automatic operation. *Bellows Co.*

. . . for more details, circle No. 235 on postcard

SELF-SEALING FASTENERS
. . . with maximum shear and tensile strength



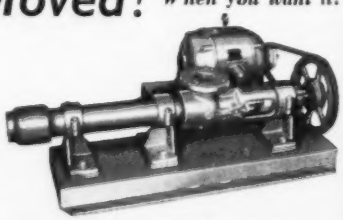
These reusable fasteners have a new design, which uses a standard AN or MS "O" ring to seal mating surface to head of threaded fastener. No galling on reuse, and no need for lubricating seal ring. Maximum shear and tensile strength qualities are equal to AN and NAS counterparts. *Aero Bolt & Screw Co., Inc.*

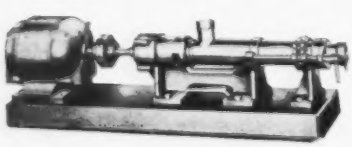
. . . for more details, circle No. 236 on postcard

With Moyno Pumps Material Is Moved!

Where you want it! When you want it!

NO TYPE LIMITATIONS. The Moyno principle knows no type limitations. Liquids, abrasives, solids in suspension—a Moyno pumps all with equal ease. There's only one moving part, a helical rotor turning in a double helical stator—no delicate vanes, no reciprocating parts, no valves. That's why a Moyno is always on the job where pumping was a problem.





HOW ABOUT YOU? These amazing pumps have solved hundreds of tough pumping problems. If you're interested in good pumping, investigate the advantages Robbins & Myers Moyno Pumps have to offer. They'll stand up where other pumps fail, delivering positive pressures, without pulsation. There's a Moyno for every purpose. Chances are they're just what you're looking for. Why not inquire today?

Call "Fernholtz" First for Complete Information

FERNHOLTZ MACHINERY CO.

8468-W Melrose Place
LOS ANGELES 46, CALIFORNIA
Telephone OLive 3-2360

. . . for more details, circle No. 67 on Reader Service Postcard

2,000-LB. PALLET HANDLER
. . . light-weight construction for easy moving

Low-cost Model A hand truck, of 2,000-lb. capacity, is said to cut manual effort by 25% because of its light-weight and maneuverability. Tubular steel frame gives more strength per pound. Dual articulating steering wheels provide ease of steering and aid truck stability. Lifts total of 4 in. from ground in nine foot pedal strokes. Standard fork widths are 24, 27, and 30 in. Unit can be built to handle standard pallets of 30 to 72-in. sizes in 6-in. increments. *Yale & Towne Mfg. Co.*

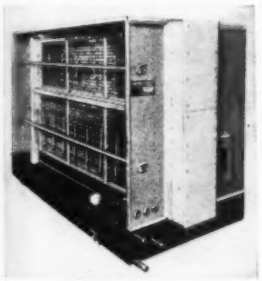
. . . for more details, circle No. 237 on postcard

HYDROELECTRIC WORK TOWER
. . . plugs into 110-v. a-c outlet

New elevating work tower for one-man use is powered by ¾-hp. single-phase electric motor, which can be plugged into ordinary outlet. Motor operates an hydraulic pump which raises work platform from 7 ft. to 17 ft. above the floor in 25 sec. Working capacity is 400 lb. Fifty-foot heavy-duty extension cable permits working along a 100-ft. strip before moving to another outlet. Other features of Moto-Lift ML-4-AC: foot buttons for lift action, swivel casters, safety brakes, telescoping action for moving through doors. *Safway Steel Products, Inc.*

. . . for more details, circle No. 238 on postcard

SPRAYED COIL DEHUMIDIFIER
. . . designed for easy maintenance



New line of central station type dehumidifiers provides capacities from 2,300 cfm. up to 45,900 cfm. Units come in standard arrangements 1, 2, and 3 coils high and from 4 to 8 coil rows deep. Special access door on air-output end of unit provides quick access to coils, drain trough, and tank in that area. Coils are removable. Spray nozzles, float valve, strainer, coil face, drain troughs, and tank are accessible from air-inlet end. *American Blower Corp.*

. . . for more details, circle No. 239 on postcard

NEW-TYPE SOCKET SCREW
. . . can be wrenched from either end

Socket of this new patented through-broached screw extends full length of screw and is symmetrical so that screw can be wrenched from either end, useful in automatic assembly operations. No grinding or modifications are required for use in power screwdrivers. Can be used either as set screws or locking rings; available in sizes ranging from No. 4 wire size to 1-in. diameter; either hex or multiple spline socket. *Bristol Co.*

. . . for more details, circle No. 240 on postcard

NOPAK Shelf-Stock Cylinders

- **Low Prices but Top Quality**
- **No Waiting for "Specials"**
- **Less Design and Layout Expense**

Compare the prices and scope of NOPAK Shelf-Stock (1½ to 8" bore with 1 to 15" stroke) with competitive offerings and you'll specify these NOPAK Class 1 cylinders to cut costs.

LIST PRICES F. O. B. Milwaukee, Wisconsin — Subject to Revision

Cyl. Dia. Bore	STOCK STROKE LENGTHS — All Double Acting								
	1"	2"	3"	4"	6"	8"	10"	12"	15"
1½"	24.16	25.72	26.08	26.44	27.16	27.88	28.60	29.32	30.40
2"	26.24	27.88	28.32	28.76	29.64	30.52	31.40	32.28	33.60
2½"	32.36	34.12	34.68	35.24	36.36	37.48	38.60	39.72	41.40
3"	35.04	37.28	37.92	38.56	39.84	41.12	42.40	43.68	45.60
4"	40.84	43.68	44.52	45.36	47.04	48.72	50.40	52.08	54.60
4½"	48.96	51.92	52.88	53.84	55.76	57.68	59.60	61.52	64.40
6"	66.60	70.80	72.20	73.60	76.40	79.20	82.00	84.80	89.00
8"	——	126.80	129.20	131.60	136.40	141.20	146.00	150.80	158.00

- **Basic mountings "A" and "E" (see above) convertible to "B", "C", "D", or "F" (see below) by changing heads. Add 10% to above list prices (no extra charge for 8" bore.)**
- **Piston rods have B-1, NF male thread.**
- **Cushioning can be eliminated on either or both ends by removing spring and ball-check.**

NOTE: Class 1 cylinders listed, for Air or Oil to 300 psi. Water use requires 1 week delivery for chrome plating of steel components.

NOPAK 4-Way Valves (¼ to 2" IPS) hand, foot, solenoid or pilot operated, to actuate all cylinders, also in Shelf-stock.

GALLAND-HENNING NOPAK DIVISION
2749 SOUTH 31st STREET
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NOPAK
® **VALVES AND CYLINDERS**
DESIGNED for AIR and HYDRAULIC SERVICE

NOPAK Shelf-Stock also maintained in other principal cities. Write for list.

A 8367-½V

Pacific Coast Representatives: **The Willard Engineering Co.**, Los Angeles 7, Calif.; **John F. Woodhead**, c/o Sales Eng. Co., Salt Lake City, Utah; **Caldwell Machinery Co.**, Portland, Oregon; **E. C. Griffin Co.**, Seattle 4, Wash.; **Western Mach. Co.**, Spokane 11, Wash.; **Transmission Engineering Co.**, San Francisco 5, Calif.

. . . for more details, circle No. 68 on Reader Service Postcard

Need a really accurate collet chuck?
Before you buy **COMPARE** the new
HANCOCK Ball-Bearing **CHUKOLLET**
with any collet holder.

COMPARE for accuracy!
COMPARE for versatility!
COMPARE for gripping power!
COMPARE set-up time!
COMPARE price!

No collet chuck is as versatile, can grip as tightly or as accurately as the new Chukollet. Can be used on any machine in the shop.

No other collet chuck has an adjustable stop for positive axial location to .0005 inch! 5C collet is not drawn in while closing.

See for yourself. Make a test in your own shop next time you have a job that demands the ultimate in axial and radial accuracy. Remember, Chukollet is guaranteed. Money refunded in 30 days if not completely satisfied! Send for literature today.

Manufacturers' agents and dealers, several territories available.

HANCOCK MFG. CO.
Santa Clara, Calif.

. . . for more details, circle No. 69 on Reader Service Postcard

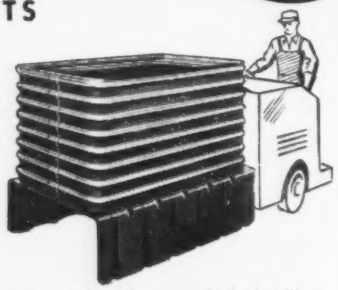
RUGGEDNESS in *Motion*

MATERIAL HANDLING *with* REPUBLIC STEEL
STEEL BOXES, SKIDS and PALLETS

STEEL BOXES
Dump box type, roll-over, fork-truck type, tiering type and special purpose units.

STEEL SKIDS
4" to 18" high in wide range of sizes.

STEEL PALLETS
Single-face, semi-double face and double-face types available in many sizes.



Designed to speed up movement and cut down costs in the handling of materials in this competitive, fast-moving era — these Republic steel boxes, skids and pallets are meeting industry's needs everywhere. Precision-fabricated from strong, corrugated steel sheets, these practical, flexible items can be used in combination with power lift trucks, cranes or hand-operated units.

OTHER PRODUCTS FOR INDUSTRY
Steel shelving, shop desks, tool room equipment, lockers, office desks, bar racks, files and tables.

PETLEY INCORPORATED
INDUSTRIAL AND AUTOMOTIVE EQUIPMENT ENGINEERS

Representatives:
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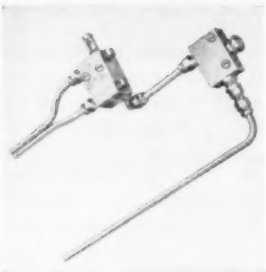
(Pressed Steel Division)

899-73rd Ave., Oakland 21, Calif.
Telephone: TRinidad 2-7621

5424 E. Slauson Ave., Los Angeles 22, Calif.
Telephone: RAymond 3-3327

. . . for more details, circle No. 70 on Reader Service Postcard

SPRAY PANEL
. . . creates penetrating lube spray



Self-contained spray valve panels are fastened to gear housing or framework and spray lubricant direct to pressure side of gear teeth. Gear lubricant is supplied through circuit of Dualine measuring valves to stainless spray valves on panel, which mix lubricant with air to form a penetrating spray. Bulletin 26-R describes this centralized system of lubrication. *Farval Corp.*

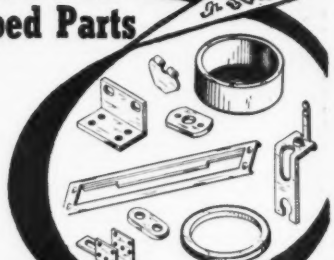
. . . for more details, circle No. 241 on postcard

SELF-WRENCHING LOCKNUT
. . . has greater strength but less weight

New ESNA Type N2603 nut has lug which braces against an adjoining surface to keep nut from rotating during wrenching of bolt. Both nut and lug are cadmium-plated steel. Smallest locknut in series weighs 1.2 lb./100 and the largest 6.2 lb./100. *Elastic Stop Nut Corp. of America*

. . . for more details, circle No. 242 on postcard

TEMPORARY TOOLING
Specialized Small Irregular Shaped Parts



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- ☒ COUNTERSUNK

Years of tooling experience, combined with modern machines has proven over the past 20 years that the temporary die method is the most economical for model work and small production runs.

NOW SERVING THE WESTERN STATES

SHORT RUN Stamping Co.
2231 CHICO STREET
EL MONTE, CALIF.
(A Suburb of Los Angeles)

Send prints for firm quotation and detailed cost comparison.

MAIL PRINTS TODAY!
or Call
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STAMPINGS in SMALL LOTS

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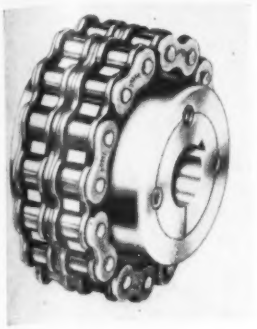
TAPER-LOCK CHAIN COUPLINGS
. . . double-width chain gives longer life



These new chain couplings, designed to accommodate slight angular and parallel shaft misalignment, provide strong and positive, yet compact, direct coupling of shafts. Additional bearing area of double-width chain permits higher horsepower ratings and longer wear life. No reboring required for Taper-Lock bushings, which give equivalent of shrunk-on fit. *Dodge Manufacturing Corp.*

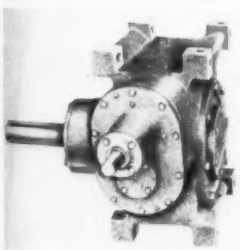
. . . for more details, circle No. 243 on postcard

5,000-LB. FORK LIFT TRUCK
. . . with fingertip direction and speed control

New Model L-524 Mobilift fork truck has 5,000-lb. capacity at 24-in. load center. Fingertip levers control forward and reverse movement and two-speed transmission. One-piece hood gives easy access to engine compartment. Equipped with high free lift, Mobil-Matic drive, fluid coupling, Hydra-Lizer, Chrysler industrial 6-cylinder engine, Hobbs hour meter, cushion or solid tires, and other features. *Lamson Mobilift Corp.*

. . . for more details, circle No. 244 on postcard

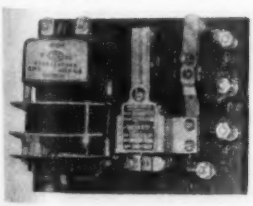
SPEED REDUCER DRIVE
. . . fits almost any mounting conditions



Output shaft of this new combination helical and worm gear speed reducer can be mounted either horizontally or vertically. Input shaft is at a horizontal right angle. This gives the HVUT unit universal versatility in fitting mounting conditions in overhead, trolley, floor, and pit type conveyors and other industrial applications. Wide range of output speeds, and ratios from 50:1 up to 1,800:1. *Philadelphia Gear Works*

. . . for more details, circle No. 245 on postcard

NEW CLOSE DIFFERENTIAL RELAY
. . . operates on small voltage



New "reduced size" relay (Bulletin 1054-207S) has a variety of industrial applications. In power and lighting systems it can be used as a voltage relay to protect electrical equipment against low voltage or over voltage. As a frequency relay, it provides over-frequency and under-frequency protection between extremely close tolerances. Available open or enclosed, one or two poles, normally open or normally closed. *Automatic Switch Co.*

. . . for more details, circle No. 246 on postcard

Cool, Safe
on the
HOTTEST, TOUGHEST
Cutting jobs...

VICTOR

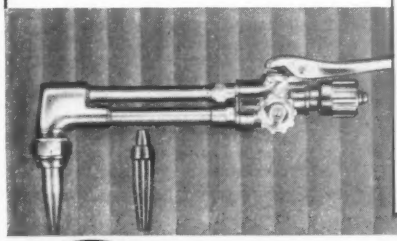
CUTTING TORCHES

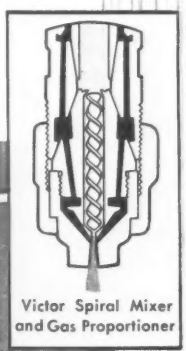
With stainless steel head and tube assemblies.

Time-tested spiral mixers

NOW all Victor torches and cutting attachments have rugged, stainless steel head and tube assemblies, plus time-tested spiral mixers to give you cool, safe cutting on your toughest, hottest cutting jobs. Stainless steel assembly absorbs heat slowly, withstands roughest use, is easier to maintain. Famous Victor spiral gas mixer prevents flashback and back fire, thoroughly mixes gases to make your gas dollars go further. Head and tube assembly is one unit, and can be replaced without buying a complete torch.

Test the Victor cutting torch on your most demanding, severest cutting job. See for yourself how cool it stays, how fast it cuts. Your Victor dealer will gladly demonstrate it. See him *today*.





Victor Spiral Mixer and Gas Proportioner

VICTOR for welding

Cutting attachment, and cut-away of a typical Victor tip, showing carefully proportioned orifices. For best results, always use Victor tips with Victor torches.

25

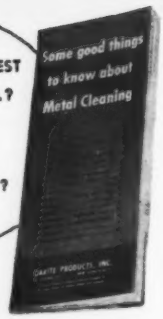
VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

844 Folsom St., San Francisco 7 — 3821 Santa Fe Avenue, Los Angeles 58

. . . for more details, circle No. 72 on Reader Service Postcard

WHAT'S THE FASTEST WAY TO CLEAN METAL? See page 11
WHAT'S THE MOST ECONOMICAL WAY? See page 9



Oakite's FREE Booklet

"Some good things to know about Metal Cleaning"

answers many questions that mean better production, more profit for you. Just look at the table of contents:

- Tank cleaning methods
- Machine cleaning methods
- Electrocleaning steel
- Electrocleaning nonferrous metals
- Pickling, deoxidizing, bright dipping
- Pre-paint treatment in machines, in tanks and by hand
- Zinc phosphate coatings
- Paint-stripping
- Steam-detergent cleaning
- Barrel finishing, burnishing
- Better cleaning in hard-water areas
- Treating water in paint spray booths
- Rust prevention
- Machining and grinding

FREE For this 44-page illustrated booklet, write Oakite Products, Inc., 1001 E. First St., Los Angeles, or 681 Market St., San Francisco, Calif.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of U. S. and Canada

. . . for more details, circle No. 73 on Reader Service Postcard

AIR-VALVE PAINT SPRAY GUN

. . . uses standardized nozzles, tips, needles

New Sharpe Model 35 spray gun is lightweight, balanced, with a comfortable grip handle. Precision gun head is attached by heavy internal screw to rigid aluminum alloy handle and may be easily replaced. Standard air valve and spray width control valve are provided. Nozzles, fluid tips, and needles are interchangeable. *Sharpe Manufacturing Co.*

. . . for more details, circle No. 247 on postcard

NEW IRON POWDER ELECTRODE

. . . for fast build-up of worn parts at low cost

New electrode, Jet-Hard BU-90, is designed especially for maintenance and repair welding. Amount of metal deposited per minute is said to be 35 to 45% higher than with conventional build-up electrodes. Arc is smooth with minimum spatter. Medium carbon, medium alloy deposit builds up worn parts with dense, moderately hard, machinable surface to resist shock and abrasion. For operation on either d-c, electrode negative or a-c; available in 5/32-in., 3/16-in., and ¼-in. sizes. *Lincoln Electric Co.*

. . . for more details, circle No. 248 on postcard

— — — — *why speculate?*
specify — — — — — — — —
STATE TUBE *to be sure!*

Every element of chance has been eliminated through careful inspection and quality control on each length . . . . . *Play it safe with "STATE".*

COLD ROLLED **TUBING** ELECTRIC WELDED

Manufacturer of top quality steel tubing in both plating and painting grades. Sizes include ½", ⅝", ¾", ⅞", 1" and 1¼". Other sizes available.

Rigid tolerance standards, uniformly welded, cut and deburred if desired. Dependable, fast service. Competitive prices.

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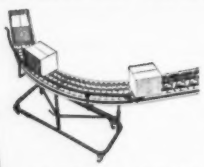
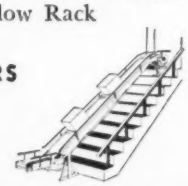
MATERIALS HANDLING EQUIPMENT



GRAVITY CONVEYORS
- Wheel & Roller
- Aluminum & Steel
- Flow Rack

POWER CONVEYORS
- Permanent Belt
- Portable Belt
- Overhead Chain



INDUSTRIAL CASTERS & WHEELS
Cold-forged & Steel-forged

LOCAL WEST COAST STOCKS

LOS ANGELES E. A. Stevenson Co., Trinity 6905
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SAN FRANCISCO Rapistan of California, Inc.,
Yukon 2-3880, 444 Brannan St., San Francisco 7, Calif.

SEATTLE Air-Mac, Inc. of Washington, MU 3388,
3838 4th Ave., S., Seattle 4, Washington

PORTLAND Air-Mac, Inc. of Oregon, Elmore 6524,
1435 S.E. Union Ave., Portland 14, Oregon

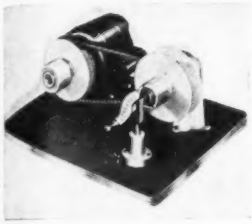
. . . for more details, circle No. 75 on Reader Service Postcard

INDUSTRIAL PAPER WIPER
. . . perforations speed up absorption

"Perf-Embossed" sheets are welded together for extra durability, and chemical treatment adds wet strength, to create a new type of paper wiper which is clean, strong, safe, and uniform. *Scott Paper Co.*

. . . for more details, circle No. 249 on postcard

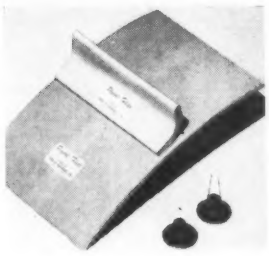
NEW VARIABLE SPEED PULLEY
. . . maintains constant belt alignment



New Lovejoy compound drive is designed for installation in new equipment but can also be used to replace units now in use. It provides constant belt alignment through its entire speed range up to 8:1 ratio, using ⅞-in. top width belt. Available in either spring loaded or manually operated design, ½ or ¾ hp. at 1,750 rpm., units accommodate new NEMA motor frame shaft sizes. *Lovejoy Flexible Coupling Co.*

. . . for more details, circle No. 250 on postcard

CONVEYOR-BELT CLEATS
. . . stop slippage on inclined hauls



New Pivot-Flite rubber cleats are an economical solution to problem of conveying loads up steep inclines. They can be installed on old or new belts—if necessary, without removing belt from conveyor — by means of molded rubber rivets, which cannot tear belt. Cleats can be transferred to new belts, if desired. *Holz Tire & Rubber Co.*

. . . for more details, circle No. 251 on postcard

THREAD REPAIR KITS
. . . for faster, easier vehicle and machine maintenance

"Shop-Packs" are now available in 29 types, each containing inserts, tap, and inserting tool in metal-edged box for quick repair of damaged, stripped, or worn threads. Sizes range from 6-32 to 1½-6 in both NF and NC series. Only three steps are required in repairing a thread with an insert: (1) drill out damaged threads, (2) tap new threads to accommodate insert, and (3) screw in the insert. *Heli-Coil Corp.*

. . . for more details, circle No. 252 on postcard

Given Manufacturing Company

prefers the *flexible* health plan

The Given Manufacturing Co., incorporated in 1946, introduced at that time the famous Waste King Pulverator. Today, Waste King Pulverators are increasing cleanliness and convenience in 750,000 American kitchens . . . and they have solved, once-and-for-all, the tremendous food waste elimination problems of hotels, restaurants, hospitals and other food preparing institutions. Given Manufacturing Co. and its affiliates employ 716 persons, comprising one of more than 10,000 California groups protecting their employees through a specially designed CPS-Blue Shield plan. Your broker, or the CPS office in your community, has full details. Call today.

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Blue Shield ®

431 S. FAIRFAX AVENUE, LOS ANGELES • 450 MISSION STREET, SAN FRANCISCO
And Offices in Sixteen Other Principal Califpornia Cities

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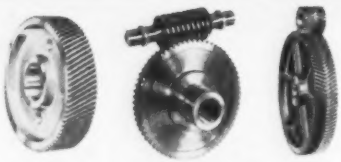

50 YEARS
GEAR SERVICE
TO INDUSTRY

The More Particular You Are In Selecting Gears, The More Likely You Are To Select JOHNSON

JOHNSON GEAR
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8th & PARKER STREETS
BERKELEY 10, CALIFORNIA

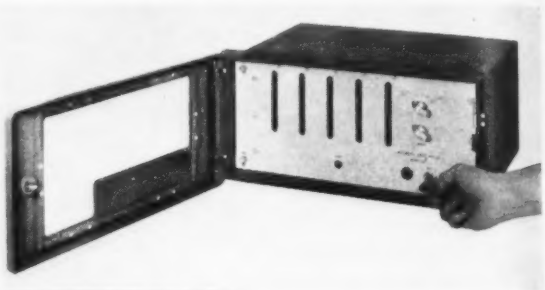
. . . for more details, circle No. 77 on Reader Service Postcard

RAM TRUCKS
. . . heavyweights for handling coils

New series of ram trucks, Elpar R-Series, is offered in capacities from 20,000 to 80,000 lb. for handling heavy coils. Featured: dual power plants with separate drive motors and reduction units for each pair of drive wheels, narrow width design for operation in confined areas, dual lift cylinders eliminating lift chains, power-operated hydraulic brakes in drive wheels, power steering. *Elwell-Parker Electric Co.*

. . . for more details, circle No. 253 on postcard

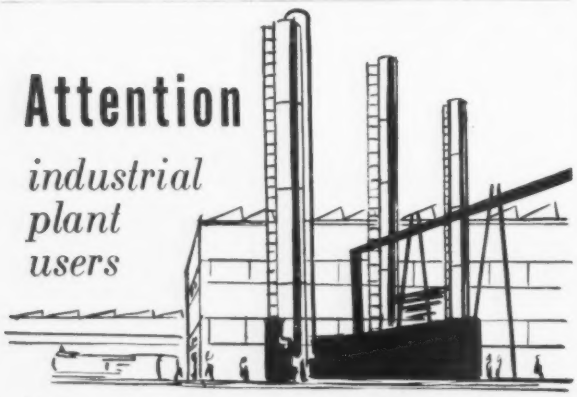
HIGH-SPEED COUNTER-CONTROLLER
. . . uses rugged new electromagnetic device



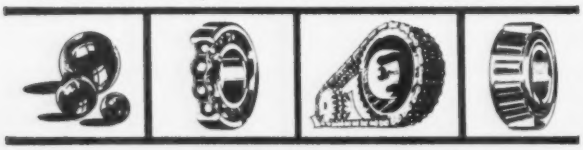
"Magnetic" industrial counting and control instruments are now in production by Berkeley Division of Beckman Instruments. They are said to operate at electronic speed and precision, with reliability and strength of simple electromagnetic devices. A tiny magnetic amplifier, the "Feristor" is new element in design, replacing the customary vacuum tubes. Model above is a dual preset controller capable of counting at rates to 10,000 counts per second and producing output signals at each of two presettable count totals. Adaptable to batching, weighing, counting, sorting, and packaging operations; cutting sheet or strip stock to length; machine or process control. *Berkeley Division of Beckman Instruments, Inc.*

. . . for more details, circle No. 254 on postcard

Attention
industrial plant users



We are Power Transmission Equipment & Bearing Specialists
COMPLETE STOCKS, EXPERT SERVICE AND FAST DELIVERY



serving California since 1919

EDWARD D. MALTBY CO.
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Branches
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SULPHURIC ACID
for the west
66° BAUME 20%
98% OLEUM
and special grades

Garfield CHEMICAL & MFG. CORP.
ESTABLISHED 1916
700 CRANDALL BUILDING
SALT LAKE CITY, UTAH

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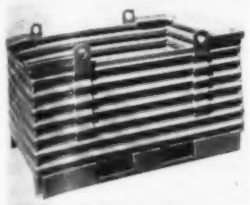
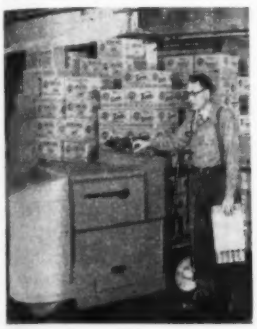
ALL-STEEL SKID BOXES
. . . with safety corners for better stacking



New corrugated all-steel, 4-way-entrance skid boxes are safer (because of new reinforced square corners), stronger (with their reinforced rolled edges and lapped seams), more spacious. Built to customer specifications, optional features are crane bars and stacking brackets. *Palmer-Shile Co.*

. . . for more details, circle No. 255 on postcard

3-WHEEL TOW TRUCK
. . . will ride or walk the operator



Dual controls are now installed on the Tow-Bear, a completely hydraulic tow truck introduced early this year, so that operator can start or stop machine when walking along either side as well as riding. Controls are self-canceling when operator removes his hand. Automotive-type batteries are recharged by plugging into any 110-v. wall socket. *Tow-Bear Division, Hudson House, Inc.*

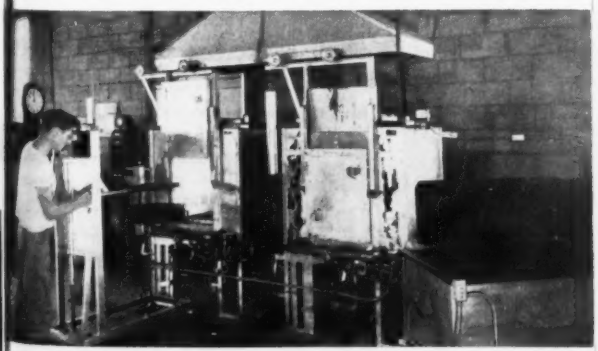
. . . for more details, circle No. 256 on postcard

NOW YOU CAN HAVE QUALITY CONTROL with the ALPINE CONTRO-THERM PROCESS OF HEAT TREATING

COMPETITION IN MODERN BUSINESS demands that you provide under your own roof and under your own supervision CONTROL OF HEAT TREATING

The most important process involved in the manufacture of your product

A COMPLETE LINE OF INDUSTRIAL FURNACES



Hardening High Speed In A Controtherm Installation

Guaranteed Lower Costs — Less Processing Time

Consistently Better End Product

Write for complete information

A. D. ALPINE, INC.

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Handy Pump says:

"The New Blackmer *Flo-master* is here to give you a lift with your liquid handling problems"

FLO-MASTER — the latest addition to the Blackmer family of fine hand pumps.

BLACKMER liquid materials handling ®

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Industrial, Hand and Truck Pumps, Strainers, Pressure Control Valves

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See Yellow pages for your local sales representative

. . . for more details, circle No. 81 on Reader Service Postcard

. . . for more details, circle No. 82 on Reader Service Postcard

TRADE WINDS

News for you about suppliers of plant operating equipment

New warehouse for Chain Belt

Chain Belt Co. has opened a new San Francisco district warehouse and sales office in Berkeley at 2940 Seventh St. Total area of the new building is 11,000 sq. ft., 8,000 of which is warehouse space.

Formerly located in San Francisco, new district offices are managed by *Robert R. Bolin*, manager of the San Francisco district for Chain Belt Co. for the past two years. Serving California as far south as Fresno, Monterey, and Mono counties and 12 counties in western Nevada, the new warehouse stocks full line of Chain Belt mechanical power transmission and conveying equipment.

Freight facilities for the firm consist of a loading-unloading dock, which will handle two trucks, and a rail spur.

Garrett Supply adds Aro Tool line

Formerly handling the Aro Air Tool line of drills and tappers, balancers, rotary files and grinders, and air hoists in its Phoenix, Ariz., branch facility, the Garrett Supply Corp. has added the stock to its Los Angeles facility and will distribute the line in the Southern California area. Large stocks of Aro parts will also be maintained.

Mayhew Products Company

Presents a NEW

Industrial Portable Unit

for RECONDITIONING all types of

Oils and Solvents

SAVE—Oil and Solvent, Equipment, Down Time, Maintenance, Labor, Storage and Disposal Problems.

USE AS—Filter, Reclaimer, Transfer Pump, Circulating Pump, Engine or Machine De-Sludger, Flushing Machine, Combination.

Filter or reclaim oils wherever they may be—in service or out of service—in machine sumps, reservoirs, tanks or barrels.

The **Mayhew** Portable Oil and Solvent Reconditioning Units remove and render harmless from industrial oils and solvents solids of all nature, suspended solids from oil deterioration due to heat and oxidation, gums, varnishes, acids, water and emulsions.

Available in 5- 10- 20-gal. per min. capacities.

Ask for demonstration—no obligation

MAYHEW PRODUCTS COMPANY

2423 E. 57th St., Los Angeles 58, Calif. Phone: LO 5-2958

"Oils are only as good as their purity."

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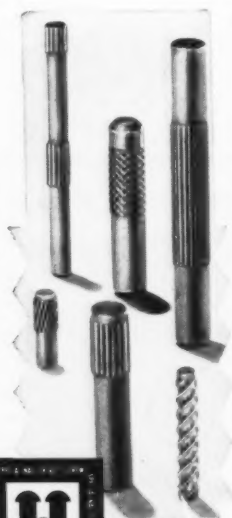

CUT FASTENING COSTS with HASSALL THREADED PINS

- Low cost
- To your specifications
- Roll threaded for greater strength
- Large or small quantities
- Close tolerances
- Any finish • All metals

We are saving many of our customers from 20% to 50% on their special small threaded pins. These threaded pins may be made to your specifications in a wide variety of metals and finishes. Large or small runs are economical.

Let HASSALL quote on your small threaded pins . . . we can show you real savings.

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ESTABLISHED 1850

Other HASSALL Specials

- Rivets
- Nails
- Studs
- Hinge Pins
- Screws
- Drive Screws
- Machine Screws
- Fasteners
- Small parts

Our 3 color decimal equivalent wall chart and our complete catalog on request.

JOHN HASSALL, INC.

P.O. Box 2186 Westbury, L.I., N.Y.

Los Angeles Representative: C. W. Warren Co., 646 N. Fuller Avenue, Los Angeles 36, California

. . . for more details, circle No. 84 on Reader Service Postcard

Three parts depots for Gerlinger Carrier

Gerlinger Carrier Co. opens a main parts depot at its home location, Dallas, Ore., and two in the East, one in Cleveland, Ohio, and one in Memphis, Tenn. New depots will carry a complete stock of parts in relation to number and types of Gerlinger material carriers and fork lift trucks in each territory.

David Brown appoints Seattle distributor

Cascade Machinery Co., Seattle, Wash., has been appointed by David Brown (Canada), Ltd., of Oakland, Calif., as distributor in Washington and Alaska areas for the Radicon speed reducer. Complete packaged drives including entire assembly of motor, reducer, flexible coupling, and any variable speed drive will b supplied by the newly appointed distributor.

Los Angeles reps elect officers

Officers-elect for 1956 were installed December 15 by the Los Angeles Chapter of the Representatives. *Vern T. Rupp*, V. T. Rupp Co., is group's new president and *Norman Marshank*, Marshank Sales Co., is new vice president. Secretary-treasurer is *Jackson Edwards* of Jackson Edwards Co. and *Mal Mobley, Jr.*, is new executive secretary. Also elected were members of the board of governors, the advisory council, and special subcommittees and standing committees.

Phoenix office opened by Lewis-Shepard

Headed up by *L. J. Clarke*, Tucson representative for Lewis-Shepard, a new sales and service office has been opened in Phoenix, Ariz., by this materials handling equipment manufacturer. *Melvin A. Kimmel* has been named branch manager.

New Denver facility for Lincoln Electric

Previously represented in the Denver, Colo., area only by Johnson Supply Co., Lincoln Electric Co. has opened a branch office and warehouse at 1224 Walnut St. there. *Merrill F. Yale*, formerly sales engineer in firm's San Francisco, Calif., office, is new Denver district manager. He is assisted by *Scotty Lambrecht*, a native of Denver, and Johnson Supply will continue to sell Lincoln products.

Ducommun opens house in Berkeley

Established to serve the Northern California area, the Berkeley, Calif., plant of Ducommun Metals and Supply Co. was officially opened December 2. More than 2,000 customers, suppliers, and community leaders attended the celebration.

Aluminum, brass, copper, stainless steel, seamless mechanical tubing, cold finished steel bars, and other metals items are in stock at the new facility, managed by *Joe Rabb*.

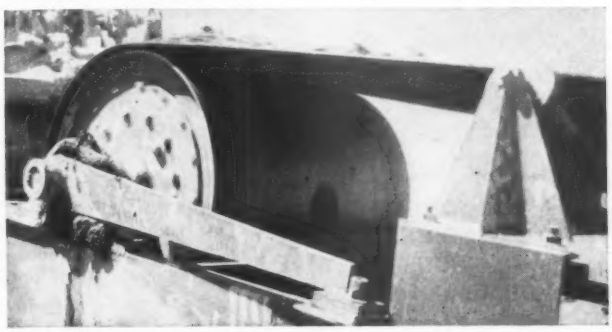
New warehouse and shop for Fresno Trailer

Distributor for White-Autocar in the Fresno, Calif., area, Fresno Trailer Co. has moved to a new 16,000-sq. ft. building at Jensen and East Ave. Space has been allocated as follows: 13,000-ft. shop area, 765-ft. office area, and 2,800-ft. parts room. Maintenance shop, employing 21 mechanics, is equipped to handle repairs on both White and Autocar trucks and overhaul and general repair service on Cummins engines. In addition to a complete line of accessories, a large inventory of repair parts has been stocked for both lines in the new stockroom.

"The Head Pulley with Motor Inside." Safe, compact, simple—no chains, no belts, no sprockets, no exposed motors.

Built by Yuba for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington.

Built and sold in other states by Iowa Mfg. Co., Cedar Rapids, Iowa.



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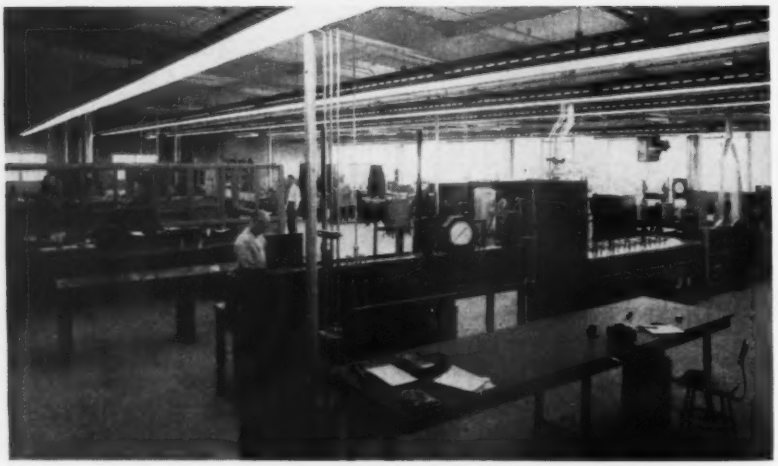

New Western headquarters for Taylor

Western regional headquarters for Taylor Instrument Co., for many years located in San Francisco, have been established in a new building at 1661 Timothy Drive, San Leandro. George H. Linsley, regional manager, reports that the property is 1½ acres and the building covers 17,000 sq. ft., 6,000 sq. ft. of which provides space for assembly and repair instruments, a like amount for warehouse and parts stocks, and 5,000 for offices. Plant size can be doubled when needed.

The shop includes recently developed equipment for manufacturing thermal tube systems for recording and control instruments and calibration and synchronization of control instruments. An engineering demonstration and assembly room permits setting up control problems similar to those arising in various industries and working them out with process engineers of the companies involved. It also provides an opportunity for training instrument engineers.

Rodney Metals of California, Inc.

Rodney Metals, Inc., of New Bedford, Mass., has set up a subsidiary, Rodney Metals of California, Inc., to operate new office and warehouse at 4312 Pacific Way, Los Angeles, specializing in precision rolled, wide, thin metal strip. Full line of Rodney products will be warehoused in Los Angeles, and operation will be under supervision of *William Brown*.

Air-Mac named by Martin-Decker

Martin-Decker Corp., of Long Beach, Calif., has picked Air-Mac, Inc., of Seattle as exclusive distributor of its products in Washington, Oregon, Montana, and northern Idaho. Products include crane weight indicators, hook scales, logweighers, lift-truck scales, and other heavy-duty weight and tension indicating instruments. Other offices of Air-Mac are in Spokane, Tacoma, Portland, Eugene, and Yakima.

Multi-Matic changes its name

Multi-Matic Corp., Van Nuys, Calif., is changing its company name to Gen-A-Matic Corp. because of popularity of its Gen-A-Matic line of generators and pumps. Generator line is made up of portable electric plants, in 24 models, introduced a little over a year ago. Also manufactured are Gen-A-Matic centrifugal self-priming pumps. Firm, in addition, produces portable one-man operated earth boring machines known as Super Hole-A-Matics and dollies and trailers for use in transporting generators.

Ion-Exchange division for Infilco

Manufacturer of equipment for water and waste treatment, Infilco Inc. of Tucson, Ariz., announces establishment of new Ion-Exchange division. New division will be under supervision of *Howard W. Frazer*, who joined Infilco in 1936 and has been field engineer specializing in ion-exchange treatment since 1949.

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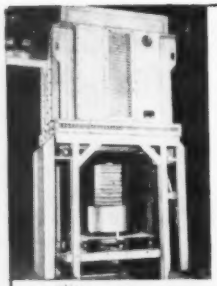

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Ziegler Steel to double facility size

Operating a steel warehouse in Oakland, Calif., since 1949. Ziegler Steel Service Corp. starts construction on a building addition which will increase plant facilities by 100%.

A similar expansion was completed more than a year ago in warehouse and service facilities of a division maintained in Los Angeles by Ziegler Steel Service Corp.

Larger quarters for A. B. Boyd in Portland

Moving to a new location, 930 S. E. Oak St., has given the Portland, Ore., branch of A. B. Boyd Co. 10,000 sq. ft. of space. Headquartered in San Francisco, the firm is distributor for Industrial division of Armstrong Cork, American Felt, L-O-F Glass Fibers, and Rubatex division of Great American Industries.

Oil-Rite appoints Western sales reps

Wesrep Corp., of Los Angeles, has been appointed Western sales representative for Oil-Rite Corp., Manitowoc, Wis., line of Modern-engineered lubricating systems and oilers. Newly appointed representative has recently expanded its facilities by moving into larger quarters. In addition to its industrial lines, Wesrep represents manufacturers of electronic components sold to aircraft and electronic manufacturers with a staff that includes mechanical and electronic engineers and four sales engineers who cover the entire 11 Western state region.

Two from Northwest elected by bearing group

At its annual meeting in Chicago, the Anti-Friction Bearing Distributors Assoc. elected *E. B. Williamson* as national president. Mr. Williamson is chairman of the board and founder of Bearings Sales and Service Inc., Seattle, Wash. *Gordon Tupling*, serving with the Portland, Ore., branch of Bearings Sales and Service, was elected national treasurer of the group.

MEN OF THE TRADE IN THE NEWS . . .

B. F. Goodrich Co.

. . . names *P. X. Daniels*, former Denver district manager of replacement tire sales for company's tire and equipment division, to new assignment as manager of special accounts. He will continue his headquarters in Denver. Succeeding him as Denver district manager is *D. J. Jakle*, former area manager at Phoenix, Ariz., for Los Angeles replacement tire sales district.

Baron Industries

. . . appoints *John A. McFarland* manager of its newly created Oakland, Calif., sales office. He joined company in 1953 and has since served as sales engineer in Los Angeles headquarters of company, which manufactures industrial ovens, vapor degreasers, and paint finishing equipment.

Harron, Rickard & McCone Co. of Southern California

. . . elects *William F. Wolf* vice president and manager of its machine tool division. He is the former owner of W. F. Wolf Machinery Co., a Los Angeles machine tool distributing firm, which he operated from 1951 until recently joining Harron, Rickard & McCone. From 1946 to 1951 he was also associated with this company in Los Angeles, holding the post of sales engineer.

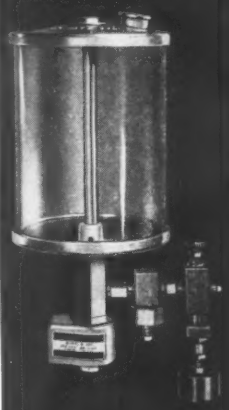
Elgin National Watch Co.

. . . names *Harold Holsten* field engineer in its abrasives division, to serve West Coast manufacturers in metal trades. His offices will be in Monrovia, Calif., and he will serve states of California, Oregon, Washington, and Arizona.

Rockwell Manufacturing Co.

. . . appoints *William F. Gulley* as San Francisco district sales manager for company's Meter and Valve Division. He is

Oil-Rite automatic chain oilers



- Reduces chain wear and stretch
- Saves maintenance labor cost
- Eliminates costly and unreliable hand oiling
- Prevents expensive shutdowns for hand oiling
- Oils wearing surfaces
- Feeds correct amount of oil—avoids excess lubrication—dripping and slippery floors
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succeeded in that post at Seattle by *Roy E. Nimtz*, who for the past three years has been serving as a sales engineer in San Francisco district.

Fabriform Metal Products

. . . promotes *A. M. Thompson* from post of sales and advertising manager to division manager. He will continue to handle his former responsibilities. This company is a Los Angeles subsidiary of George Getz Corp., Chicago.

Towmotor Corp.

. . . names *Walter A. O'Brien* manager of its Oakland, Calif., factory sales and service branch. He has been Western states district service representative for this Cleveland, Ohio, company for past several years.

Johnson Bronze Co.

. . . names *Joseph T. McGowan* district sales representative for Northwest territory, with headquarters in Seattle. He will represent complete line of sleeve bearings manufactured by this New Castle, Pa., company in area of Washington, Oregon, Idaho, Montana, Wyoming, and Western Canada. Mr. McGowan was formerly in home office at New Castle.

United States Steel Corp.

. . . picks *John B. French* to manage sheet metal sales for its Columbia-Geneva division, with offices in San Francisco. He will be responsible for planning distribution and merchandising of sheet products in the eleven Western states. Mr. French has served since 1954 as special assistant to *R. E. Williams*, assistant vice president of sales.

Food Machinery and Chemical Corp.

. . . appoints *J. M. Devers* director of marketing of its Packing Equipment division at Riverside, Calif., a newly created post concerned with national distribution of division's products. *I. J. Blondon* is named general sales manager. *L. M. Emanuel* becomes sales manager, fruit and vegetable industries, and *Lee Harrel* manager of division's southwest district. *Newell Carter* is picked to head division's Santa Paula branch office.

. . . appoints *Walter J. Blair* as process pump specialist for its Peerless Pump division, with offices at company's Los Angeles plant. He has been in field sales work for Pacific district during the last eight years.

Townsend Co.

. . . transfers *William F. Arnoldy*, application engineer at New Brighton, Pa., company headquarters, to its Santa Ana, Calif., aircraft sales division office. He has been with company since 1951 and in his new position will provide technical liaison with aircraft industry on Cherry blind rivets and lockbolts.

Westinghouse Electric Corp.

. . . appoints *Clifford W. Colman* area sales manager at San Francisco. He moves from Salt Lake City, where he has been an apparatus sales engineer in company's Intermountain district headquarters. *Karl K. Lacher* succeeds him at Salt Lake City, moving up from post of engineering and service engineer.

Sterling Electric Motors, Inc.

. . . names *Arthur J. Allcock, Jr.*, chief staff engineer. He advances from position of chief mechanical engineer, in which he has taken a major part in development of product improvements. In his new post he will travel throughout the country, working with nationwide sales organization of this Los Angeles manufacturer.

Minneapolis-Honeywell Regulator Co.

. . . appoints *Glenn M. Rhode* as branch heating controls division manager at Los Angeles.

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HIGHLIGHTS . . . read details under state headings

Sperry Rand picks Phoenix as site for two new plants (p. 107)

$5,000,000 program begun by Inspiration Consolidated Copper (p. 107)

Atomic research center at Livermore, Calif., for G-E (p. 107)

Axelson Manufacturing builds new plant in Montebello, Calif. (p. 107)

Calspray Chemical awards two contracts on its new plant (p. 107)

Nash plant at El Segundo acquired by Howard Hughes (p. 107)

Business index in West continues to rise (p. 110)

Glenn L. Martin Co. picks Denver for new missile plant (p. 112)

$2,000,000 expansion now in progress for Gates Rubber (p. 112)

$7,000,000 program planned by Bunker Hill & Sullivan (p. 112)

ARIZONA

SPERRY RAND—Two plants will be built in the Phoenix area by aviation division of Sperry Rand Corp., New York. First, a hangar and shop at Sky Harbor, will be completed by next year. Second, a flight research center and electronics plant, will be built later at another site.

MORE COPPER—Inspiration Consolidated Copper Co. will embark on $5,000,000 modernization program in 1956 at its Inspiration concentrating plant, raising daily capacity to 16,000 tons of ore, which will be put through a dual process for increased recovery of copper. Contract has been awarded Western-Knapp Engineering Co.

GOETZ PLANT SOLD—Vacuum and ice cooling plants at Tolleson owned by Charles E. Goetz are sold to City Products Corp. of Chicago, which has a controlling interest in another Tolleson company, Crystal Ice and Cold Storage Co.

BRITISH COLUMBIA

AMERICAN-MARIETTA GROWS—American-Marietta Co. of Canada, Ltd., British Columbia subsidiary of American-Marietta Co., will build synthetic resin plant in Edmonton, Alberta, to serve plywood and allied industries in Alberta. Adhesive, resin, and chemical division of American-Marietta has plants in Seattle and Portland.

CALIFORNIA

G-E ATOM RESEARCH—General Electric Co. proposes $5,000,000 atomic research and development center near Livermore, to be built by 1957. By 1965, laboratory would be expanded with additional $3,000,000 facilities, employing total of 700 or 800 persons.

AXELSON EXPANDS—New 120,000-sq. ft. building will be added to present Montebello plant of Axelson Manufacturing Co., division of U. S. Industries, Inc. To cost over $1,000,000, plant will consolidate all Axelson aircraft manufacturing activities at Montebello, releasing space in Vernon plant for exclusive manufacture of petroleum and machine tools.

CALSPRAY CONTRACTS—California Spray-Chemical Co., now building $16,000,000 fertilizer plant in Richmond, awards two contracts for auxiliary structures: to F. P. Lathrop Co., Berkeley, contract for construction of office facilities and change room for plant; to Barrett Construction Co., San Francisco, contract for bulk storage warehouse.

HUGHES BUYS NASH PLANT—Howard Hughes purchases 42-acre tract of land and almost 500,000 sq. ft. of buildings in El Segundo formerly used for Nash assembly plant from American Motors Corp., for over $3,000,000. Facilities will be used to consolidate Hughes electronic manufacturing operations.

BUILDING PLANS AT NORTHROP—Northrop Aircraft, Inc., undertakes "facilities consolidation program" at cost of about $8,000,000, to be completed in late 1956. Core of program is construction of new 250,000-sq. ft. engineering center at Hawthorne, including engineering test laboratory, low-speed wind tunnel, and cafeteria. Northrop has also started work on new building at its Palmdale production flight test installation.

BUY MAG-ELECTRIC—Mag-Electric Products, Inc., Hawthorne, is acquired by National Aircraft Corp., Burbank aircraft firm organized several months ago by Reagan C. Stunkel. New subsidiary, which will continue in operation at its present location, manufactures electronic components.

TURLOCK CONTAINER PLANT—International Paper Co. will build container manufacturing plant at Turlock which will have monthly production capacity of 20,000,000 paper containers to serve milk industry.

ELECTRONICS LAB—Raytheon Manufacturing Co. of Waltham, Mass., and Chicago, will build electronics engineering laboratory on 27-acre site in Santa Barbara. Laboratory will employ 120 persons at start.

2,000 RAIL CARS—Pacific Fruit Express Co. will build 2,000 refrigerator cars at its Roseville, Los Angeles, and Colton shops, at a total estimated cost of $26,000,000, to go into service between December 1956 and July 1957.

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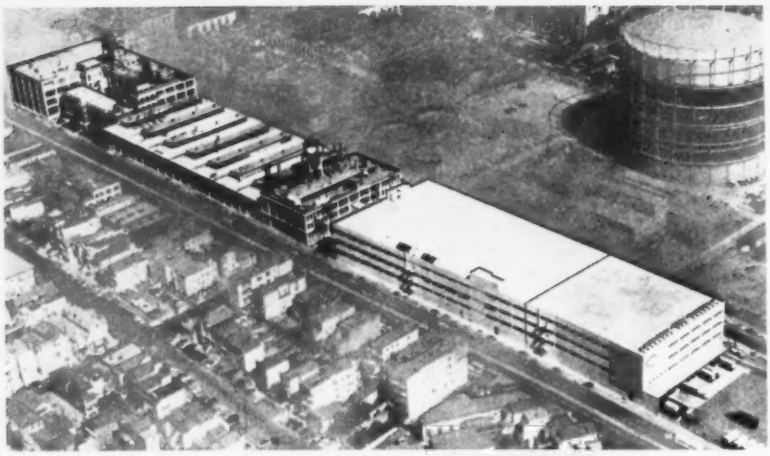
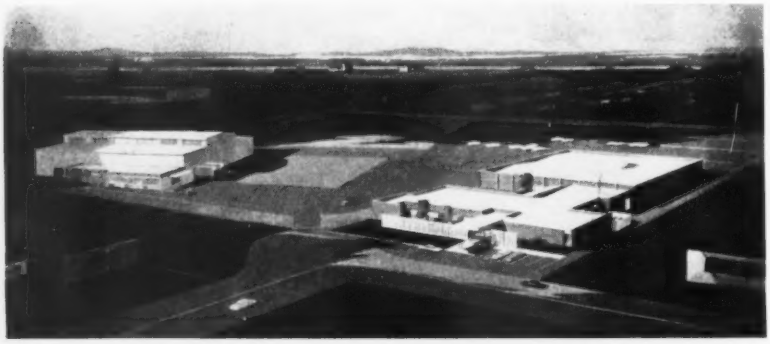


LARGEST IN WEST—Expansion of American Can Co.'s San Francisco plant, at cost of about $2,000,000, increases floor area by almost 75%, to a total of 813,295 sq. ft., making this plant the largest container-manufacturing factory in the West. Principal output will be metal and fiber containers for food and industrial products. Annual output at full capacity will be 1½ billion containers, employing 1,400 persons.



NEW PLANT FOR PACIFIC SCIENTIFIC—Architect's drawing of proposed $400,000 Los Angeles plant for Pacific Scientific Co., which will provide 31,000 sq. ft. in two buildings, housing aeronautical and industrial heat treating furnace divisions of company. Company expects to move from its present plant about March 1, 1956.

STEAM PLANT AT OXNARD—Southern California Edison Co., Los Angeles, buys about 100 acres of land near Oxnard for construction of steam-electric generating plant, which is now subject of application before California Public Utilities Commission. Plans call for start of construction in 1956 on first unit, to cost about $35,000,000.

CONTRACTS FOR AEROJET—Air Force awards $12,300,000 contract to Aerojet-General Corp. for machinery and equipment to be produced at its Nimbus liquid fuel rocket plant. Glenn L. Martin Co., which holds contract from Navy for a part of the man-made satellite project, awards Aerojet a contract for building rocket motor.

EL SEGUNDO MOVE—West Coast division of Hetherington, Inc., manufacturer of electrical control equipment for aviation and electronic industries, moves from Culver City to larger quarters in El Segundo.

BUILD FOR M. I. T.—Rucker Co., Oakland, is awarded contract valued at over $300,000 from Massachusetts Institute of Technology, Boston, Mass., to design and manufacture a precision hydraulically-driven 500-hp. centrifuge acceleration test machine. Equipment will be used to test guided missiles at various acceleration loads.

MICROLOC MOVES—Microloc Corp., designer and manufacturer of impulse generators and other components for weapons systems, moves to enlarged quarters in Los Angeles.

LOVEQUIST BUILDS—Lovequist Engineering Co., Los Angeles aircraft parts firm and manufacturer of machine tools, is building 12,000-sq. ft. plant in Van Nuys which will double production capacity. Plant will cost over $750,000.

EXPAND TORRANCE RUBBER PLANT—Shell Chemical Corp. plans to add new facilities at synthetic rubber plant in Torrance which was purchased from federal government last year. Program includes equipment for manufacturing cold high solids latex, used in making foam rubber.

MORE POWER AT HUNTERS POINT—Pacific Gas and Electric Co., San Francisco, files application with California Public Utilities Commission covering construction of $21,000,000 addition to steam-electric generating plant at Hunters Point. New unit would generate 165,000 kw. of power, bringing total capacity of station to 427,000 kw. Work is planned to begin by mid-summer and to be completed in about two years.

BATTERY COMPANY MOVES—Associated Battery Corp. moves its plant from Los Angeles to Murrieta, in Riverside County. Present capacity is 2,000 batteries a day, employing 35 persons.

OCEANSIDE INDUSTRIAL CENTER—Projected $10,000,000 industrial development will get into motion this month near Oceanside with start of building construction on 45 acres of a 100-acre site. Developers are Roymar Land Co. Designers and engineers are Pollack, Kahn and Assoc., Los Angeles.

PACKAGING FIRM MOVES—Air-Pack Corp., contract packaging firm which is a subsidiary of Flying Tiger Line, Inc., moves its main plant to 30,000-ft. facility in Monterey Park. A Burbank headquarters will be retained to serve that area.

BUY REFINERY AT NORWALK—Malco Refineries, Inc., Roswell, N. Mex., buys Wilshire Oil Co. refinery at Norwalk and reportedly will embark on $4,000,000 modernization program, as well as construction of $1,000,000 marine terminal at Huntington Beach.

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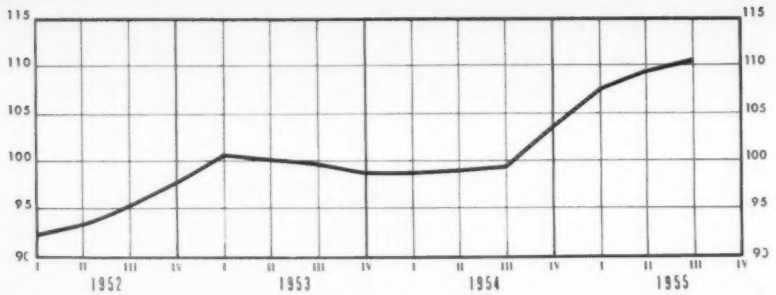

STILL GOING UP—Index of business activity in third quarter of 1955 rises 1.0% above preceding quarter, and 11.3% above third quarter of 1954. Construction activity continues at high level reached in last quarter. Manufacturing payrolls fall by nearly 1% compared with last quarter but are 15% above third quarter, 1954. This index is prepared by Western home office of Prudential Insurance Co. of America, Los Angeles.

TRAILMOBILE TO BUILD—Trailmobile, Inc., subsidiary of Pullman, Inc., purchases plant site near Livermore for future construction of plant to manufacture truck-trailers. Company, which operates plant in Berkeley, has main headquarters in Cincinnati, Ohio.

ADD PRODUCT—American Potash & Chemical Corp. is building new facility at its Eston Chemicals plant in Vernon, to produce technical parathion for company's own needs and Richmond plant of California Spray-Chemical Corp. Facility will begin production early in 1956.

AUTRON GROWS—Autron Engineering, Inc., Los Angeles, acquires Judge and Co. Engineers, engineering and design firm in field of plant automation.

MACHINE PLANT GROWS—H. W. Loud Machine Works, Inc., Pomona, is completing $700,000 plant and facilities expansion program, which includes new building to house six hydrotels for large milled structural fittings, and enlargement of tool and die department.

BUILDING FEED PLANT—General Mills, Inc., Minneapolis, Minn., is building poultry and livestock feed plant in Stockton which is scheduled to be in operation around September 1956.

AIR FORCE CONTRACT—Packard-Bell Co., Los Angeles, receives $3,700,000 contract from Air Force for electronic airborne navigation equipment produced by firm's technical products division.

BUY SANTA MONICA FIRM—Curtiss-Wright Corp., New York, acquires Propulsion Research Corp. of Santa Monica, engineering and manufacturing firm in field of advanced aircraft powerplants. Purchased company will continue in operation under present name.

NORRIS-THERMADOR ADDS—Norris-Thermador Corp., Los Angeles, buys manufacturing equipment and tooling of Industrial Fabricators Co., Burbank. Operations will move in a few months to Norris-Thermador's plant at Walnut, Calif., expanding Walnut division's manufacture of aircraft parts and adding new line of metal kitchen cabinets to its production.

RYAN-DOUGLAS—Ryan Aeronautical Co. is awarded $20,000,000 contract by Douglas Aircraft Co. to build power packages and mountings for use in Douglas DC-8 commercial jet transports.

RETRON GROWS—Retron Corp., Pasadena electronics firm, adds 15,000-sq. ft. area to its plant, increasing capacity by 40%. Company is an affiliate of Reed & Reese, Inc.

SLIDING GLASS DOORS—New $250,000 plant of Ador Corp., manufacturer of Ador aluminum sliding glass doors, opens in Fullerton.

MOLDING MACHINES — Automatic Molding Machine Co., Los Angeles, begins production of automatic compression molding machinery for plastic parts.

NEW STEEL FABRICATOR—Structural Fabricated Steel Corp., newly organized firm for industrial steel fabrication, moves into this plant in San Fernando Valley. President is Herbert Ziegler; general manager, Leo J. Caton.

POTTER PACIFIC—New $[illegible]00,000 plant is under construction on [illegible]-acre site in Malibu for Potter Pacific Western affiliate of Potter Aeronautical Co., Union, N. J. Plant will produce electronic instruments and pharmaceutical equipment.

SHEET METAL—McFadden and Mitchell, Inc., starts operations in newly built plant in Burbank. Firm will perform sheet metal fabrication.

NEW MANUFACTURER—Pacific Solenoids, Inc., newly organized El Segundo firm begins operations in field of custom engineering and manufacturing of packaged devices, such as rotary solenoids and electro mechanical devices.

ALUMINUM EXTRUSIONS — Coast Aluminum Co. opens its new 32,000-sq. ft. Gardena plant this month, producing aluminum casement windows.

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NEW ELECTRONICS FIRM—Research Development Manufacture, Inc., Philadelphia, Pa., sets up West Coast division and branch plant in Los Angeles, offering engineering and manufacturing facilities for electronics and aircraft firms.

MOVE TO PASADENA—Electron Products Inc., Los Angeles subsidiary of Preco Inc., moves its operations to newly constructed plant in Pasadena which provides about 12,000 sq. ft. of floor space.

BRANCH FOR NEPTUNE—Neptune Meter Co. begins operations of testing, repairing, and warehousing meters for water and other liquids at new West Coast headquarters in East Los Angeles.

LIGHT INDUSTRY SOUGHT—Rohnert Park Industrial Center is set up south of Santa Rosa, part of a planned community projected for Sonoma County which will include 8,000 homes.

ORDNANCE CONTRACT—Food Machinery & Chemical Corp., San Jose, receives $4,000,000 contract from Alco Products, Inc., Schenectady, N. Y., covering rack suspension systems for medium tanks.

CONTRACT FOR FLETCHER—Fletcher Aviation Corp. of Rosemead is awarded $13,000,000 Air Force contract for jettisonable wing tanks.

Forty seconds after entering this special automatic perforating die, below, 18-guage USS steel sheet comes out stamped 852 times; ready to be formed into grillwork for the Wesix electric heater shown at left. All of these parts for electric heating equipment made by the Wesix Heater Company, San Francisco, are produced from United States Steel.

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WEBER ELECTRONICS—Weber Aircraft Corp., Burbank, establishes new electronics division, headed by James H. Doyle.

OPEN AIRCRAFT PLANT—Douglas Aircraft Co. begins production at its new $2,000,000 plant in Culver City, which will be occupied gradually by an increasing number of departments.

NEW DIVISIONS—North American Aviation, Inc., sets up Rocketdyne division to carry on continued research, development, and manufacture of rocket engines, and Autonetics division to continue engineering and manufacturing in electromechanical field, including development and production of automatic navigation systems for missiles and aircraft. North American receives $10,000,000 Air Force contract for work on intercontinental guided missile.

COLORADO

MARTIN PICKS DENVER—Glenn L. Martin Co. buys 4,000 acres and leases another 1,200 acres of land near Denver for construction of guided missile and aviation plant which will cost initially over $5,000,000. Work on plant is under way, scheduled for completion in about 15 months.

GATES RUBBER GROWING—A $2,000,000 expansion is underway for Gates Rubber Co., Denver, to include construction of two additional buildings and gas turbine power plant.

ELECTRONICS PLANT IN DENVER—Ramo-Wooldridge Corp. options 800 acres of land near Littleton, outside Denver, as prospective site for electronics plant to be built in 1956. Company will reportedly manufacture component parts for Glenn L. Martin Co.'s guided missile production.

NEW PLANT OPENS—$1,000,000 plant for Heiland division of Minneapolis-Honeywell Regulator Co. opens in Denver with dedication ceremony. Division produces instruments for scientific and laboratory use and photoflash equipment.

REFINERY CONTRACT—American Gilsonite Co., Salt Lake City affiliate of Standard Oil Co. of Calif., awards contract for constructing catalytic reformer and hydrogen plant near Grand Junction, Colo., to H. K. Ferguson Co. of Cleveland, Ohio. Other contracts, making up a total of over $10,000,000 have been awarded to Foster Wheeler Corp. of New York, for construction of delayed coking plant; Petrocarb Equipment, Inc., New York, for engineering work on calcining operations; and Kaiser Engineers, Oakland, Calif., for design and construction of calcining plant and auxiliary facilities. Plant will produce gasoline and coke from Gilsonite, which will be moved in suspension by pipeline from Bonanza, Utah, to Grand Junction.

BURLINGTON FREIGHT WAREHOUSE—Burlington Lines opens new $175,000 public distribution warehouse in Denver, which offers 15,000 sq. ft. of floor space and freight loading and unloading facilities on non-lease basis.

SWEENEY EXPANDS—B. K. Sweeney Co., Denver tool manufacturer, plans to add new production and warehousing building to its plant sometime next spring.

ARAPAHOE ADDS—Arapahoe Chemicals, Inc., Boulder, is putting up new steel building at its plant to house new boiler and two gas-fired reactors, as well as constructing plant addition to house new processing equipment. Cost of expansion will be about $35,000.

CONTAINER PLANT AT WORK—Fibreboard Products Inc. completes new plant at Denver for manufacture of milk containers.

IDAHO

$7,000,000 EXPANSION—Bunker Hill & Sullivan Mining & Concentrating Co. will start work soon on first phase of ultimate $7,000,000 program to increase capacity of its electrolytic zinc plant at Kellogg. Production now is about 4,800 tons of slab zinc per month, which will be raised to total of 7,200 tons when expansion is complete.

PULP MILL OPENS—Clearwater pulp and paper mill of Potlatch Forests, Inc., starts production, employing 175 men. Capacity of new mill is about 325 tons daily.

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MONTANA

TERMINAL OPENED—Consolidated Freightways moves into new $300,000 terminal and warehouse at Billings.

OREGON

DWYER EXPANDS—Dwyer Lumber Co. is adding $120,000 log barking equipment to its Portland mill.

PLANT ADDITION—W. J. Voit Rubber Corp. begins operations in its new $500,000 factory addition at Portland, doubling output of tread rubber and tire repair material.

MORE SPACE FOR MACHINE FIRM—Screw Machine Products Co. buys 5-acre tract with two buildings, providing 75,000 sq. ft. of floor space, in Portland, and will move its airplane maintenance equipment manufacturing division to these quarters. Estimated total cost of new plant is $250,000.

UTAH

URANIUM MILL AT LA SAL—Continental Uranium, Inc., Grand Junction, Colo., contracts with Atomic Energy Commission to build and operate a uranium processing mill at La Sal. Plant is scheduled to open in summer of 1956.

TRUCK LINE SOLD—Interstate Motor Lines, Inc., Salt Lake City, acquires facilities and operations of Air Line Express Co., Denver.

MORE STEEL—Geneva works of Columbia-Geneva Division, U. S. Steel Corp., undertakes expansion which will raise capacity by 20%.

WASHINGTON

EXPAND POWER STATION—Puget Sound Power & Light Co., Seattle, undertakes expansion program at its Snoqualmie Falls hydroelectric generating station, to cost about $3,000,000 and expand capacity from present 22,000 to 42,000 kw. Project will be completed in April 1957.

ADD AT HANFORD—Atomic Energy Commission awards $1,869,580 contract to Morrison-Knudsen Co., Seattle, for additions to pumping plants and offices in several Hanford production areas.

NAME CHANGE—Puget Sound Sheet Metal Works, Seattle, changes its corporate name to Puget Sound Fabricators, Inc., to give a more accurate description of company's current operations.

BIGGER BIRDS EYE—Plant addition housing two new processing lines is planned for construction at Walla Walla plant of Birds Eye Division, General Foods Corp.

WYOMING

PLANT COMPLETED—Continental Oil Co.'s $700,000 natural gasoline plant near Sussex is completed and will operate in connection with company's $1,750,000 gasoline recovery and gas repressuring plant at that location.

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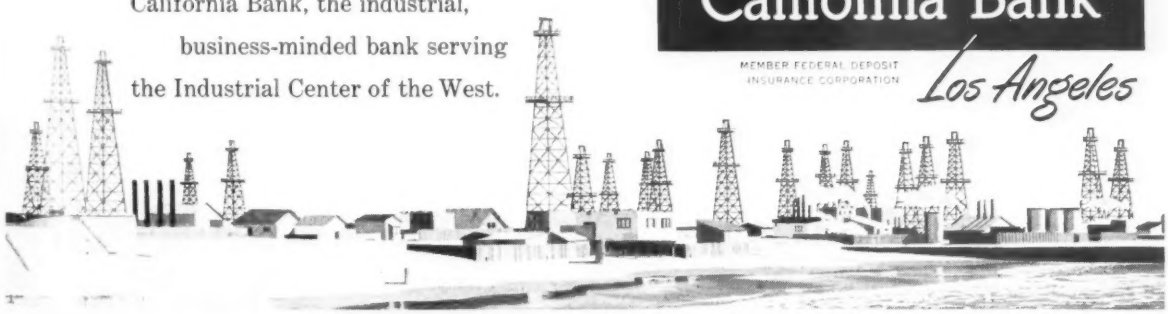

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MAKING "Rain Drops" the BUTAY WAY...

Outside Redler elevates material from track hopper to discharge either at storage tank or to 30 ft. inclined conveyor which in turn delivers to a horizontal conveyor on the plant roof.

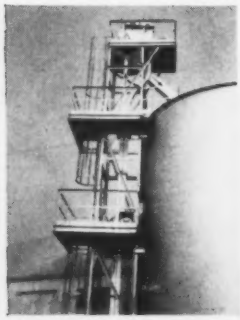
This 5-inch Redler conveyor on roof receives material from the 30 ft. inclined Redler and in turn carries it 51 ft. to the point of discharge into plant (right foreground).

WITH AN S-A ENGINEERED BULK MATERIAL HANDLING SYSTEM!

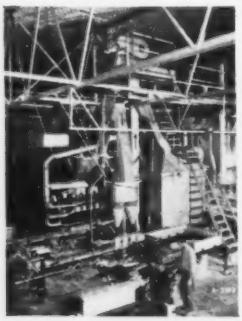
Manufactured by the Butay Products Company, Los Angeles, "RAIN DROPS" is a water softening and blueing agent. To provide swift, economical conveying and mixing of this product's base ingredient, Stephens-Adamson engineered a system which saves many costly material handling hours.

Completely automated, this system consists of a batch skip, mixer unit, and L-type sealed casing Redler conveyors which eliminate all dusting problems. From the point of delivery outside the plant to the packaged product itself, raw material moves swiftly and smoothly by 100% mechanical means.

The Butay installation is an outstanding example of Stephens-Adamson overall planning. More than 50 years' experience in designing and manufacturing equipment that conveys at lowest cost per ton qualifies S-A for any assignment in mass movement of bulk material.



Close-up view of Redler elevator showing double leg at head end, assuring perfect discharge. Discharge is to storage or to roof conveyor. Rate 10 tons per hour. Sealed casing of Redler permits outside operation without housing.



Complexity of layout is illustrated by this interior processing station photo. Skip delivers to mixer which dumps to hopper feeding L type Redler. Mix is then delivered to packaging machine or to storage.

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